TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 22.] 1925. [No. 6

TUBERCULOSIS IN THE TROPICS.

FOWLER (James K.). **Tuberculosis in the Tropics.**—*Proc. Internat. Conference on Health Problems in Trop. America.* 1924. pp. 796–805. [8 refs.] [United Fruit Company, Boston, Mass.]

——. **Extracts from the Second Section of the Address on Tuberculosis in the Tropics.**—*Ibid.* pp. 806–814.

Few have had a wider experience of tuberculosis as seen in an industrialized community than Sir James Kingston Fowler, and we turn with interest to his views on tuberculosis in the tropics. We find, however, that his remarks bear, for the most part, upon the part of tuberculosis work with which he has the greatest personal familiarity and that his paper deals to a large extent with the problems of the disease in Western Europe.

Sir James rightly states that "obsolete lesions" are seldom found in negroes. This is in accord with the experience of nearly all observers and represents a fact of great importance in relation to epidemiology, especially if taken in conjunction with the extreme susceptibility of the primitive African native to tuberculosis. As Fowler points out, "the evidence is overwhelming that when tuberculosis is introduced into a country formerly free from it, the natives manifest a degree of resisting power much inferior to that shown by inhabitants of countries in which it has been present for countless generations." This is illustrated by a table of the incidence of and mortality from tuberculosis among the native and British troops in France in 1918 in which South African Native Corps was shown to have an annual case incidence of 186 and an annual mortality of 167 per 10,000 of active strength, while the British troops had an incidence of 10 and a mortality of 0·5 per 10,000 in the same period.*

Sir James Fowler, in discussing this extreme susceptibility of primitive races to tuberculosis, is inclined to attribute it to hereditary factors rather than to lack of acquired resistance. He has little hope for the success of efforts aimed at raising the resistance of

* It may be pointed out that the footnote reference to these figures attributing them to a paper by CUMMINS in the *Trans. Soc. Trop. Med.* in June, 1912, is incorrect. The figures appeared in a paper by that author in the *International Journal of Public Health*, in 1920 (see this *Bulletin*, Vol. 18, p. 62).

(K2626) Wt P157/183 1625 6/25 H & Sp Gp 52

susceptible persons by immunization and considers that "vaccinating doses of dead or attenuated tubercle bacilli" are unlikely to be the means of producing an A 1 population. "I should rather," he says, "strive in every possible way to improve the physique of the nation and thus to increase the resisting power of the people to disease, including tuberculosis."

[The only A 1 population ever seen by the reviewer was the Dinka population in 1902, a population living the life of hunters and warriors, where every adult male appeared a perfect physical type, where the food was what nature intended it to be, neither tinned nor adulterated, and the housing extremely bad but ameliorated by the fact that life was spent out of doors. These A 1 men were susceptible to tuberculosis to a surprising degree in spite of their perfect general health. This susceptibility must, according to Sir James, have been a hereditary weakness of constitution ; but it is of interest to note that it co-existed with the ideal physique which is recommended as the goal of anti-tuberculosis effort.]

In the second section of his address on "Tuberculosis in the Tropics," Sir James outlines an organization based on a Tuberculosis Settlement on the lines of the Papworth Industrial Colony together with notification of cases and such valuable adjuncts as After-Care Committees and Local Tuberculosis Centres. His scheme is an excellent one, founded on long experience of tuberculosis in England and making ample provision for the needs of the European industrial worker whose earning capacity has been impaired and his competitive powers limited by tuberculosis. It would be an experiment of great interest to apply a scheme such as this in one of our Colonies or Dependencies, and there is little doubt that it would serve a good purpose. In applying it, those concerned would have to be on the alert to see in what directions it might require modification to meet local needs. It is probable, for instance, that the Hospital Department would prove to be a much more important element than the Sanatorium Department, in view of the greater number of acute and fatal cases. The Industries Department, too, would have to meet local industrial tendencies ; and might develop on lines not quite identical with the Papworth Industries.

At Papworth, as Sir James points out, the cottages are reserved for married men only ; but in India, for instance, they might have to house the whole group of dependents and relations forming the "family" of some unhappy Bengali clerk or minor official.

A list of six "Open secrets of the successful management of the industries of a Settlement" are given, and should be studied in the original by those about to organize a Settlement in the Tropics. Here we would venture to add a seventh—to the effect that the man in charge must have a close and sympathetic acquaintance with the manners, customs and feelings of the natives and that, in addition to a good knowledge of tuberculosis, he must be well versed in other tropical diseases. An "addendum" is given in which Sir James deals trenchantly with the diagnoses made by Officers of the Ministry of Pensions in dealing with "tuberculous" ex-soldiers. Here every word is worth close attention by students of tuberculosis in a European community, but the views enunciated as to fibroid phthisis and other chronic forms of the disease have but little bearing upon tropical tuberculosis.

S. L. Cummins.

CHARLES (Richard Havelock). **Tuberculosis in India.**—*Practitioner.* 1924. Dec. Vol. 113. No. 6. (No. 678). pp. 393–398.

Charles points out that in India tuberculosis is not a new disease, but that it appears to have increased considerably during the past forty years. The increase has been most marked in those centres which have shown the greatest commercial and educational development. It is of interest to note, also, that while the smaller towns and village districts had formerly but few cases, the disease has now spread widely in these places. The author correctly states that surgical tuberculosis, far from being infrequent in India, is very wide-spread amongst the natives of that country, a point of interest since bovine infection is almost unknown and milk is invariably boiled before use.

S. L. C.

ROGERS (Leonard). **Tuberculosis Incidence and Climate in India: Rainfall and Wet Winds.**—*Brit. Med. Jl.* 1925. Feb. 7. pp. 256–259. With 2 maps in text. [4 refs.]

In this remarkable paper Sir Leonard Rogers brings about a happy combination between his knowledge of a country in which he has passed the greater part of his professional life and his familiarity with the problems of tuberculosis. The result is a communication of exceptional interest, the main findings of which are illustrated in the maps which are here reproduced and which show, in graphic form, the incidence of tuberculosis *per mille* in the jail populations of various parts of India, the annual rainfall in inches, the absolute humidity at the height of the south-west monsoon, the barometric pressures and the force and direction of the monsoon winds.

It will be seen at once that very high rainfall corresponds roughly with a very high tuberculosis incidence, as in Bengal, where there are 13·7 cases *per mille* in the jails, with a fall of over 75 inches, and along the West Coast area, where the tuberculosis incidence is 10·9 *per mille* and the rainfall 100 inches annually.

Again, the Deccan, with a low rainfall of less than 30 inches a year, has the lowest tuberculosis incidence rate, only 2·7 cases *per mille.* But these correspondences are to some extent neutralized by definite exceptions, as in the case of central Madras with a tuberculosis incidence of 11·7 *per mille* and an annual rainfall of from 20 to 30 inches, or as in "area 12," including the Himalayan Hill stations, where the low tuberculosis incidence of 3·6 *per mille* goes with a high rainfall of about 50 inches. Rogers concludes, therefore, that there must be other factors at work, and turns to the barometric pressure and the direction and force of air currents as a possible line for investigation.

Here he finds a remarkably close correspondence between the prevalence of rain-bearing wind currents and tuberculosis, and sets forth a series of observations which would appear to lend strong support to those of W. GORDON (*Brit. Med. Jl.* 1924, Nov. 29, p. 983) based on a similar study in this country.

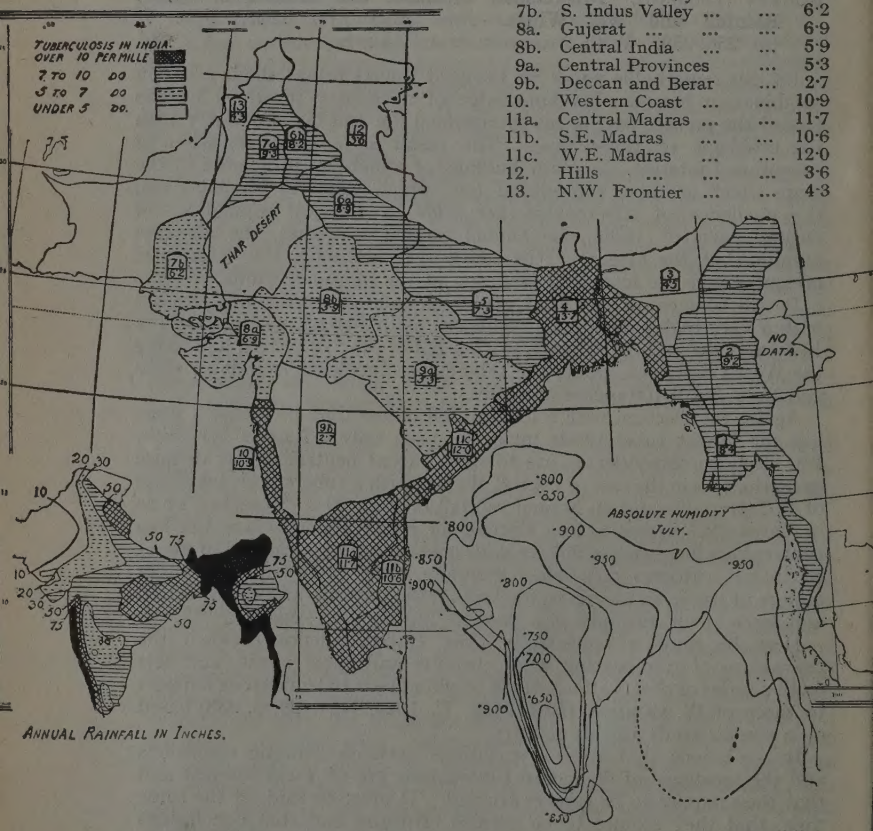
It is obvious that these correlations between climatic conditions and the incidence of diagnosed tuberculosis are of great interest and that they require to be further studied. It must be said, at the same time, that they require to be studied critically and that conclusions can only be drawn with great caution and with a full appreciation of the numerous sources of fallacy which have to be taken into account.

It will be conceded, for instance, that climatic factors cannot *cause* tuberculosis, although they may perhaps be of great importance in modifying the course of infection in persons already contaminated with the germ of the disease. To obtain the full significance from the meteorological facts and figures so carefully collected by Sir Leonard Rogers, it would be necessary to know the degree of tuberculization of the populations of the areas concerned as well as their relative density and their industrial conditions. It might be the case, for instance, that the jail population in Bengal included a

TUBERCULOSIS IN INDIA.

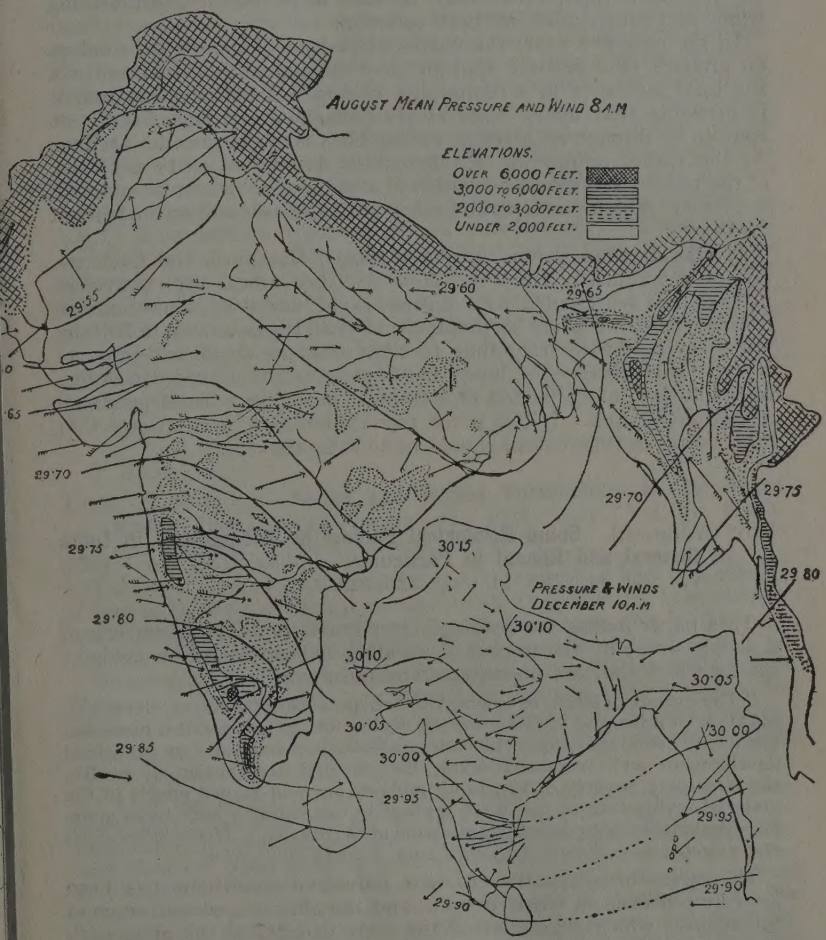
Areas and Rates per Mille of the Jail Population.

1.	Burma Coast	8·4
2.	Burma Inland	9·2
3.	Assam Valleys	4·5
4.	Bengal and Orissa ...	13·7
5.	Gangetic Plain and Chota Nagpur	7·3
6a.	E. Upper Sub-Himalayan	8·9
6b.	W. Upper Sub-Himalayan	8·2
7a.	N. Indus Valley	9·3
7b.	S. Indus Valley	6·2
8a.	Gujerat	6·9
8b.	Central India	5·9
9a.	Central Provinces ...	5·3
9b.	Deccan and Berar ...	2·7
10.	Western Coast	10·9
11a.	Central Madras	11·7
11b.	S.E. Madras	10·6
11c.	W.E. Madras	12·0
12.	Hills	3·6
13.	N.W. Frontier	4·3



Map 1.—The incidence of tuberculosis in India in relation to rainfall and humidity.
[Reproduced by permission from the *British Medical Journal.*]

relatively large number of previously infected persons likely to infect their fellows or to break down under the depression of incarceration and to develop diagnosable tuberculosis, while that of the jails in the Deccan might contain but few. It is here that we miss the splendid index to the distribution of infection provided by the systematic



Map 2.—Barometric pressures and air movements during south-west and north-west monsoons.

[Reproduced by permission from the *British Medical Journal.*]

tuberculin tests so thoroughly applied in the French colonies and so unhappily neglected in our own. But such an index is wanting in India, and our thanks are due to Sir Leonard Rogers for a study which makes the best possible use of the material available and brings many new and interesting facts to light.

S. L. C.

RAMSAY (G. C.). **Tuberculosis in Assam.** [Correspondence.]—*Brit. Med. Jl.* 1925. Mar. 14. p. 531.

Dr. Ramsay, discussing the statement of Sir Leonard ROGERS that the tuberculosis incidence is low in the jails of Assam although the rainfall is high, states that, in the Cachar district, rain-bearing winds and tuberculosis are both common.

In the past five years the deaths of persons diagnosed tuberculous on grounds of a positive sputum have amounted to 10 per cent. of the total mortality in a community of about 20,000 coolies; and it is probable that many cases escaped diagnosis through having no sputum or through no attempt having been made to find the bacillus. As the author points out, a tuberculosis death rate of 10 per cent. of the total death rate is very high in a community where pneumonia, dysentery, cholera, malaria and other acute diseases add to the general death rate.

The local tribes, Kukis, Lushais, Nagas, Manipuris and Cacharis, all suffer frequently from the disease. The clinical type prevalent in Cachar is represented by a diffuse, rapid, caseating, necrotic form of tuberculosis with rare haemoptysis; but all types, as seen in Britain, are to be met with from time to time with the single exception of lupus. This absence of lupus may, perhaps, be traced, according to the author, to the action of a tropical sun upon a bare-legged and ill-clad population. If this is the true explanation, it is strange that other forms of tuberculosis should be so little affected.

S. L. C.

ROY (Ashutosh). **Some Etiological Factors of Tuberculosis in India in General and Bengal in Particular.**—*Indian Med. Rec.* 1924. Nov. Vol. 44. No. 11. pp. 326–329.

This paper makes sad reading. It vibrates with the bitter cry of a people swept by the impact of an alien civilization into a mode of life for which they are unprepared and unsuited.

"The over-population of towns, the depopulation of villages, the multiplication of mills and of factories, the decline of agriculture, the increased means of communication which are necessary corollaries to industrial development and increased trade, the unequal distribution of wealth, the increasing poverty of the dumb millions are well-known effects of the material civilization of the West grafted to our country and have given increased facilities for direct transmission of the disease. *Hence tuberculosis is considered as a disease associated with Western civilization.*"

The stress of adaptation to new industrial conditions has been severely felt even in Great Britain, and the almost epidemic wave of tuberculosis which characterized the early decades of the nineteenth century in England and the middle and later decades in Scotland, Wales and Ireland has afforded evidence as to the effect of fairly rapid urbanization upon a relatively agricultural population. But the steady increase of commerce following the prolonged naval supremacy of an island power had gone far to prepare the people of England for the industrial developments of applied science, and a few generations of town-dwelling sufficed to bring about adaptation to the new environment and to establish the widespread acquisition of a fair margin of immunity towards tuberculosis, a fact reflected in the rapid fall in the tuberculosis death rates from 1861 onwards.

In India, the rapid development of industry finds the population quite unprepared. The sudden change from village life to town life, the sudden transition from an existence guided by calm ritual to one of intellectual stress and economic competition, is sufficient, in itself, to explain the rapid extension of tuberculosis in Bengal, and throughout India generally ; but when we add to this the retention of such social institutions as the Purdah system, child-marriage, the "joint family system," by which, perhaps, one underpaid Baboo is obliged to shoulder the financial burden of a host of relatives, we begin to see that the period of "adaptation," happily brief in this country, is likely to be more prolonged and more tragic in India, and that our "Raj" may well be faced with not altogether undeserved execration unless intelligent steps are taken to improve the situation. Are such steps still possible ? Or is it already too late ? The task of "prevention" in India promises to be no light one, since the problem depends so largely upon native customs which are quite beyond European control or modification. Dr. Roy concludes that "it is time to turn back to country life and avoid unnecessary luxuries." He is right ; but can his advice be taken ? "Back to plain living is the gist of Eastern civilization," he says, "and the soundest advice given by the greatest political thinker of modern India." India, like Europe, is "caught in the wheel of things." Civilization is a good servant, but a hard master. We can *look* back ; but can we *go* back ?

S. L. C.

OPIE (Eugene L.). **Active and Latent Tuberculosis in the Negro Race.**—*Amer. Rev. of Tuberculosis.* 1924. Nov. Vol. 10. No. 3. pp. 265–274. With 1 plate & 1 text fig.

The paper, one of great importance and interest, is best appreciated if read in the light of Opie's previous work on pulmonary tuberculosis, and especially of a notable paper from his hand appearing in the same number of the *American Review of Tuberculosis* under the title of "Pathological Evidence of First Infection in Association with Active Pulmonary Tuberculosis." In describing the results of a long series of observations on human lungs studied, after removal post-mortem, both by radiological and pathological methods, Opie showed in 1917 (*Jl. Experim. Med.*, 1917, Vol. 25, p. 855) :—

"That the healed or healing lesions present in the lungs of almost every individual after the age of 18 years have the characters of the tuberculosis of childhood and are, in their essential characters, distinguishable from the usual form of chronic pulmonary tuberculosis of adults, which almost invariably has its origin in the apices of the lung. Focal tuberculosis which, in great part, has its origin in childhood, may be seated in any part of the lungs, usually below the pleura, and not more frequently in the apex than elsewhere . . . It is especially significant that the focal lesion is associated with tuberculosis of the nearest lymph nodes."

The beautiful roentgenograms accompanying the article on "Evidence of First Infection," together with the photographs of the actual lungs after section, provide, in a graphic form, the evidence adduced for the view expressed by Opie that "there is little reason to doubt that the pre-existing focal lesion had modified the course of the apical infection," and that "the character and position of the focal lesion furnish support to the view that the apical disease is not derived

from the focal lesion, *but represents a new infection.*" This paper on "Evidence of First Infection" is based entirely upon the examination of white adults, and the following conclusions, amongst others, are drawn by its author :—

"Focal tuberculous lesions which have undergone calcification and are recognizable in roentgenograms of the excised lung are present in the lungs of 98 per cent. of white adults who die from diseases other than tuberculosis.

"Latent apical tuberculosis has been found in the lungs of one in every five of the white adults examined. These apical lesions are invariably accompanied by evidence of a pre-existing focal infection which has had its origin in childhood.

"Active pulmonary tuberculosis (phthisis) is always accompanied by evidence of a preceding tuberculous infection."

These quotations form a necessary preliminary to the consideration of the paper on "Active and Latent Tuberculosis in the Negro Race" which follows, and which depends, for its significance, upon a comparison with the findings in whites. Opie has, for convenience, made an artificial classification of the post-mortem X-ray lung pictures in terms of the extent of the calcified focal lesions detected. Applying this classification to the findings in 25 coloured adults who had died with diseases other than tuberculosis, he obtains the following results along with which, for comparison, we have tabulated his findings in 115 lungs from a comparable group of white adults :—

Calcified Focal Lesions shown by X-ray Plates.

	Calcified lesions absent.	Very small calcified lesions. (Grade 1.)	Calcified lesions. (Grade 2.)	Extensive calcified lesions. (Grade 3.)
25 coloured adults per cent.	8	32	44	16
115 white adults per cent.	1·7	22·7	65·3	10·3

As Opie remarks, "the figures, though based on a small number of instances, indicate that healed, that is, calcified, tuberculosis is less extensive in the lungs of coloured than of white adults."

Further, while latent apical tuberculosis had been found in 16 out of 74 white adults, or in 21·6 per cent., it was found once only in 17 lungs of coloured adults studied under the same conditions, or in 5·8 per cent. Amongst white adults dying of chronic pulmonary tuberculosis the lesion was found, in all the 19 cases studied, to have had its origin in the apices of the lung. During the same period and under the same conditions there was, among the coloured, only one instance of apical pulmonary tuberculosis. In this case, the disease had pursued a much more acute course than that of phthisis in white adults, and at autopsy there was widespread caseation with little, if any, formation of fibrous tissue. The evidence for a preceding infection was uncertain, but ill-defined spots suggesting early calcification were noted in the X-ray plate. The disease seen post-mortem in this young adult negress "had the characters of an infantile lesion situated at the apex of the lung." While chronic lymphatic node tuberculosis occurs in but a minimal proportion of white adults with pulmonary tuberculosis, it was found to be present in two out of the small number of instances of active tuberculosis in the negro adults studied.

An interesting text figure, here reproduced, illustrates a case of pulmonary tuberculosis in a coloured woman of 26 years, the type being exactly what is found in young white children. An acute

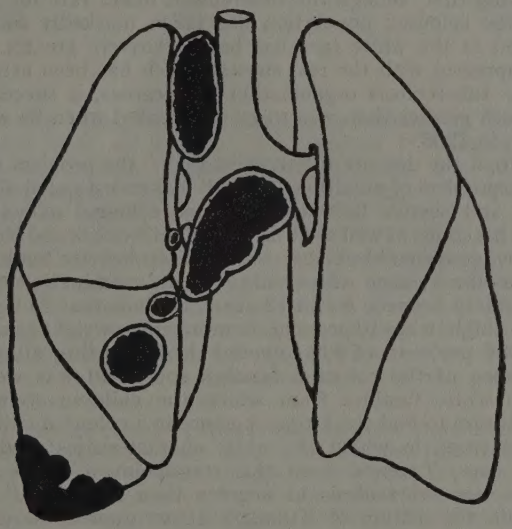


Diagram showing the distribution of pulmonary lesions in a coloured woman in the United States of America, aged 26 years. [Autopsy No. 1915.]

There is a caseous tuberculous mass at the base of the right lower lobe and massive caseous tuberculosis of peribronchial lymph nodes within the lung, of lymph nodes at the bifurcation of the trachea and of lymph nodes above the right bronchus.

[Reproduced from the *American Review of Tuberculosis.*]

focus of infection is seen at the base of the right lower lobe, and the corresponding extensive disease of the tracheo-bronchial and tracheal lymph nodes is well shown.

Opie considers that these differences observed in negroes from the clinical and pathological types seen in the tuberculosis of white adults "are best explained by partial lack of immunization during childhood." "Deficient immunization in early life is probably much more important than increased susceptibility referable to malnutrition and other conditions of living or to natural racial susceptibility."

The most important of the conclusions drawn are that the American negroes are less thoroughly tuberculized than the white race, and that "the tuberculization of a race which has for the first time come into contact with tuberculosis proceeds slowly because the acute types of tuberculosis which make their appearance are not adapted to scatter the tubercle bacillus."

S. L. C.

GRANDY (Charles R.). **Racial Characteristics as the Cause of the High Tuberculosis Death Rate among Negroes.**—*Amer. Rev. of Tuberculosis.* 1924. Nov. Vol. 10. No. 3. pp. 275–279.

Grandy, writing of observations made in Norfolk, Virginia, gives figures showing that, though the tuberculosis death rate for both the white and the coloured population has fallen markedly since 1907, the reduction in the white race has been relatively greater. He is, however, impressed with the real success which has been attained by an adequate tuberculosis organization for negroes, a success which has been much greater than was to be anticipated when he went into the question in 1908.

Starting from the dictum of EMERSON that "the problem of tuberculosis is the problem of nutrition," Grandy has investigated differences in nutrition and posture between white and coloured school-children and finds, at his clinic, as well as at the schools of Norfolk and Richmond, that the average coloured child is considerably heavier for his height and age than the average white child. In an examination of weight charts of children between 6 and 12 years, he finds that 24·6 per cent. of 967 white children are 10 per cent. or more under weight as compared with only 14·6 per cent. of 822 coloured children; this, although the average income of the coloured families concerned was well below that of the white families from which the children were drawn. Further, it is rare to find the fatigue posture in a coloured child except in light mulattoes, in whom the white characteristics predominate. As Grandy says, "viewed from this standpoint it seems that we should have less tuberculosis in negroes than in whites." Rather than question the dictum of EMERSON above quoted, he is obliged to conclude "that the height-weight tables are not infallible, and that external appearances are deceiving as indices of health." But, although expressing this opinion, Dr. Grandy is clearly a little troubled on the point, to which he returns again later. He does not deny that the negro's manner of living and his lack of prolonged racial adaptation to the life of the white man "may have an influence on his morbidity and mortality from tuberculosis; but," he goes on, "when you see a big, strong negro with moderate infection go on and die in spite of treatment, and a weak Jew with a deal more trouble get well, the likelihood of a racial or inherited immunity stands out prominently over and above all other causes." It is interesting to read this conclusion in conjunction with those of OPIE above quoted, where the immunity acquired through individual infection is given a prominent place.

S. L. C.

AGOSTINI (J. P.). **Remarks upon the Problem of Tuberculosis in Cuba.**—*Edinburgh Med. Jl.* 1925. Mar. New Ser. Vol. 32. No. 3. pp. 103–106.

This brief paper is of a general nature and does not include details about the tuberculosis of Cuba, but it is suggestive in several respects. For one thing, it pays a remarkable tribute to the success of the campaign of Preventive Medicine which followed the assumption of administrative responsibility by the Americans after the war of 1898. It would seem that this event led not only to the elimination of yellow fever and malaria as constant menaces to health, but greatly decreased the incidence of tuberculosis as well.

Dr. Agostini states that more than half of the three millions of population are "whites"; and it would appear that the tuberculosis of Cuba is, in general terms, that of a white population. As in Europe, it is in centres of industrial agglommeration that it is seen at its worst. "The great seeding places of tuberculosis" are the cigar and cigarette factories.

S. L. C.

RODHAIN (J.). **Rapport sur la tuberculose humaine au Congo Belge.**—*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop da Africa Ocidental. Vol. 5. 9a. 10a. e Sessão de encerramento.) 1923. Aug. No. 4. pp. 201–215. With 1 chart. [5 refs.]

Although there must have been occasional contact with tubercle bacilli through Arab incursions from the north, and the occasional arrival on the coast of slave-traders from Europe, it has only been since the opening up of the interior to commerce during the Belgian occupation that the natives of the Congo Province have been definitely exposed to infection on a significant scale. Of the present state of things, Rodhain speaks as follows :—

"The European carrier of Koch's bacillus has contaminated the native auxiliaries living in contact with him, soldiers, boat-men, labourers; and these, returning to their villages, have spread the infection in their turn. Little by little, endemic foci of tuberculosis have become established around the more important European centres and, although still rare in the interior, the scourge is spreading."

The author gives a brief summary of the history of this spread of tuberculous infection, instancing the case of a medical officer affected with phthisis whom he succeeded at Coquilhatville in 1904, and whose two native servants died of pulmonary tuberculosis within the next three or four years. On his return to Léopoldville in 1907, he was struck by the sharp increase in the number of natives entering the "Hôpital des Noirs" with tuberculosis, and was constrained to report as follows in 1909 :—

"The outstanding fact is the number of cases presenting the signs of tuberculosis in its different forms. Introduced from Europe, this disease, so fatal to negroes, has increased so rapidly as to occupy an important place amongst the pathological features of the area."

The observations of MOUCHET (1913) are quoted as to the post-mortem findings in tuberculous natives and on the von Pirquet reactions of various native groups in and around Léopoldville, which is noted as a definite though recently infected endemic centre. From the report of MOUCHET he cites the remark that "the native population responds to tuberculous infection in the same manner as do children in Europe."

It would appear that MOUCHET noted both at Katanga and at Stanley Pool "la rareté de l'évolution lente et progressive de la tuberculose." The type was acute and rapidly fatal. A good idea of the contrast in clinical type between the tuberculosis of European settlers or officials on the one hand and infected natives on the other is given in the table of cases of human tuberculosis in the colony from 1915 to 1922 :—

CASES OF HUMAN TUBERCULOSIS FOUND IN THE COLONY FROM 1915 TO 1922.

Year.	Number of recorded cases.		Number of deaths.		Observations.
	Europeans.	Natives.	Europeans.	Natives.	
1915 ...	13	100	—	41	It is possible that certain patients were duplicated in 1916 and 1917.
1916 ...	30	80	1	39	
1917 ...	46	109	2	45	
1918 ...	52	190	1	44	
1919 ...	34	212	3	65	
1920 ...	33	208	4	56	
1921 ...	25	233	2	60	
1922 ...	20	209	2	103	

It will be seen from the table that of 253 European cases only 15 died, or just under 6 per cent., while of 1,311 native patients, 453, or over 34 per cent., had died in the period of the observation. The table is noted as incomplete, since it deals only with the native cases coming to notice close to European centres. Doubtless many cases died undiagnosed, at places remote from skilled medical investigation. The distribution of infection throughout the country is roughly indicated by the cuti-reactions of the natives in the military school of Irebu in June, 1923 (Dr. SARCINELLA), the cadets representing 21 different centres of origin. The results are as follows :—

Number examined.				Positive results.				Intradermic control.		
Men.	Women.	Children over 5.	Children under 5.	Men.	Women.	Children.	Per cent.	Men.	Women.	Per cent.
894	273	79	39	52 or 5·77 per cent.	7 or 2·57 per cent.	0 or 0	Mean 4·8	21 or 2·3 per cent.	1 or 0·37	Mean 1·6 per cent.

As a contrast to these figures may be quoted the following table illustrating the cuti-reactions amongst scholars at Stanley Pool, drawn for the most part from homes at Léopoldville and Kinshasa :—

Scholars over 15 years.				Scholars under 15 years.				Totals.		
No. examined.	No. of positive cuti-reactions.	Per cent.	No. of doubtful cases.	No. examined.	No. of positive cuti-reactions.	Per cent.	No. of doubtful cases.	No. examined.	No. of positive cases.	Per cent.
63	34	54	16	287	76	27	4	350	110	31·4

Here the "positives" are not far behind those noted in European communities. It is of great interest to learn that, shortly after the recording of these skin reactions, an old instructor-carpenter on the

staff of the school died of a relatively chronic phthisis with cavities, having been ailing for three years. "Les écoliers ont donc rencontré l'occasion d'absorber des parasites."

The results of post-mortem examination give, perhaps, the clearest idea of the facts about tuberculosis in any given area. The following table is therefore quoted as perhaps the most important element in this valuable paper.

DISTRIBUTION OF TUBERCULOUS LESIONS REVEALED AT AUTOPSY.

Tuberculous Lesions.	Autopsies done at—			Totals.
	Léopoldville : Dr. Mouchet.	Katanga : Dr. Mouchet.	Boma : Dr. Fornara.	
Pulmonary Tuberculosis ...	26	54	21	101
Pleural ,, ...	5	8	—	13
Intestinal ,, ...	19	26	4	49
Renal ,, ...	2	3	1	6
Hepatic ,, ...	3	3	1	7
Splenic ,, ...	2	4	2	8
Laryngeal ,, ...	1	1	1	3
Peritoneal ,, ...	1	3	1	5
Cardiac ,, ...	2	2	—	4
Pericardiac ,, ...	—	1	1	2
Osseous or Osteoarticular ,, ...	1	2	2	5
Meningeal ,, ...	1	1	—	2
Cerebral ,, ...	—	—	1	1
Vesical ,, ...	—	—	1	1
Generalized Miliary ,, ...	12	27	9	48
Tuberculous Meningitis ...	1	6	?	7
Hemoptysis	1	1	?	2
No. of Autopsies	31	72	26	129

Dr. Rodhain closes his communication with a summary of the efforts made to protect the population of the Belgian Congo from further contamination, so far as this may still be possible. The Governor General, in an Order of August 7th, 1921, indicates the prophylactic measures to be used to combat the extension of tuberculosis in the colony. Notification of cases is made compulsory. The entrance to the colony of foreigners with "open" tuberculosis is forbidden. Those now resident in the colony and found to be suffering from the disease must take their departure as soon as possible and must, in the interval and during transit, submit to special prophylactic precautions on pain of isolation in hospital. Somewhat similar regulations are to apply to natives. Doctors are given the right to examine persons of all races with a view to diagnosis of the disease and the application of the precautionary measures above described. These rules, if successfully applied, should go some way towards checking the too rapid spread of tuberculosis, but, as Rodhain admits, "we know that, besides the *sick* carriers of the tubercle bacillus, there exist persons in apparently good health who are quite capable of spreading infective germs"; and it is here that the greatest difficulty is likely to be encountered.

S. L. C.

FORNARA (A.). **Note sur les formes de l'infection tuberculeuse chez les indigènes à l'hôpital des noirs à Boma.**—*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 5. 9a. 10a. e Sassão de encerramento.) 1923. Aug. No. 4. pp. 221–227. [3 refs.]

From a close and careful study of the post-mortem findings as well as of the clinical features of tuberculous cases amongst the natives of Boma, Fornara draws some interesting conclusions. The distribution of lesions found in 26 autopsies has already been given (see p. 437); it should be noted that, amongst instances of tuberculous adenitis, the following distribution was observed:—

Cervical adenitis	1
Pre-aortic	1
Mesenteric	5
Mediastinal and Peribronchial	12

The preponderance of intra-thoracic adenitis suggests the respiratory route as the chief portal of infection. Fornara has observed at Boma five cases of osteo-articular disease. He describes a case of tuberculosis of the knee-joint which has lasted for six years and is complicated with pulmonary disease. In an interesting discussion as to the factors underlying the special susceptibility of blacks to tuberculosis, he lays stress on "the absence of the previous vaccinations," so common in Europe in the form of "discrete infections contracted in early life," and raises the important question as to "whether the negro is capable of developing an immunity when in contact with tubercle bacilli or whether his organic qualities are incapable of such a defensive organization."

In an attempt to find in his own observations an answer to this question, he believes that he has been able to recognize a definite tendency to a heightened defensive power of the tissues revealing itself in a chronic type of disease and in the anatomo-pathological changes characteristic of a resistant power. The proportion of cases showing, at autopsy, the lack of resistance so common in African natives is now less than that noted at Léopoldville and Katanga by MOUCHET in 1912–13 and 1918–20.

S. L. C.

ORENSTEIN (A. J.). **Interim Report on Silicosis and Tuberculosis.**—*Proc. Transvaal Mine Med. Officers' Assoc.* 1924. Dec. Vol. 4. No. 8. pp. 13–14.

This brief analysis of Post-Mortem Diagnosis Cards from the Witwatersrand Native Labour Association Hospital, dealing with the examination of 95 consecutive cases during the period October 1922 to September 1923, constitutes a real contribution to our knowledge of the tuberculosis of the South African native labourer. Statistics based on death-rates or morbidity rates may sometimes be of value if interpreted with a proper appreciation of the nature of tuberculosis, but carefully recorded post-mortem findings reveal the nature of the disease itself and form an unequivocal basis for comparison with the tuberculosis of other areas. Only cases in which tuberculosis was found to be present at post-mortem examination are included in the card enquiry, so the 95 cards all contain a reference to the disease. Tuberculosis was the cause of death in 62 cases, 10 of these being instances of tuberculosis with silicosis. The list of post-mortem

diagnoses includes, also, seven cases of silicosis, and in these, presumably, the tuberculosis was minimal and the silicosis alone sufficient to account for death. It would appear, too, that over and above the 17 cases of "silicosis" and "tuberculosis with silicosis" there were others in which some degree of silicosis was present, as an analysis of "the lesions in cases exhibiting silicosis" suggests that any number from a minimum of 19 to a maximum of 64 cases gave evidence of silicotic changes. This numerical obscurity, depending on an omission to state whether several different types of lesions were noted in the same case, will doubtless be eliminated when more extensive analyses are published later on.

The facts noted about the tuberculous lesions are of such interest as to warrant their reproduction *in extenso*:—

PULMONARY TUBERCULOSIS :—

Involvement of pleura—

Right pleura, 8. Left pleura, 7. Both pleuras, 25. Empyema, 1.

Lesions of lungs—

Caseating ...	Right lung, 4.	Left lung, 6.	Both lungs, 17.
Miliary ...	—	—	,, ,, 15.
Both miliary and caseating	—	—	,, ,, 9.

Enlargement of glands—

Peribronchial, 55 cases. Mediastinal, 39 cases.

OTHER ORGANS AFFECTED WITH TUBERCULOSIS :—

Liver ...	miliary, 18, caseous, 5.	Adrenals ...	miliary, 5, caseous, 2.
Kidneys	,, 9, ,, 5.	Pericardium	,, 6, ,, 2.
Spleen ...	,, 18, ,, 14.	Peritoneum ...	,, 8, ,, 1.
		,, with effusion ...	,, 2, ,, 3.

Small intestine, 7. Retroperitoneal glands, 26. Cervical glands, 1.
Tubercular abscess of brain, 1. Bone tuberculosis, 1.

It will be seen that the lung lesions were all either "miliary" or "caseating" or both combined; that there were miliary lesions in *both* lungs in 15 cases, caseating lesions in *both* lungs in 17 cases, and combined miliary and caseating lesions in both lungs in nine cases. There is no mention of cavitation. While this may, of course, have been observed, the reader gains the impression that it cannot have been a marked feature. There was enlargement of the peribronchial glands in 55 and of the mediastinal glands in 39 cases. For those who are familiar with necropsy findings in this country, it would be impossible to present more forcibly the contrast between the post-mortem appearances in adult pulmonary tuberculosis as between African natives and Western Europeans. The abdominal organs showed tuberculous lesions in a large proportion of the cases, the number of caseous lesions being so great as to recall to the reader the findings usually observed in monkeys.

Dr. Orenstein rightly concludes from these records that tuberculous infections still run a markedly acute course in native mine workers. His other conclusion, "that infection by ingestion of tuberculous material may play a not inconsiderable rôle in the incidence of tuberculosis" amongst these labourers, is, we think, less justifiable. The fact that there was enlargement of the peribronchial or mediastinal glands in nearly all the cases, or, to put it otherwise, that the glands

draining the lungs were almost invariably affected, strongly suggests that it was through the respiratory tract that the infection entered the body.

[Experiments in the pathogenesis of tuberculosis carried out on guineapigs by the reviewer have shown him how easily the infection is spread throughout the body by the blood-stream after the initiation of caseous tuberculosis in the lymphatic glands of susceptible animals. There is no reason to assume that the abdominal lesions were of intestinal origin since the diffuse exudative pulmonary and intra-thoracic glandular lesions were clearly of a nature to favour rapid generalization through the blood-stream.] The fact that so many of the abdominal lesions are recorded as "miliary" lends strong support to this view. Dr. Orenstein and the Transvaal Mine Medical Officers' Association are to be congratulated on having initiated an enquiry which promises to be as illuminating as that of BORREL on the pathological lesions in the tuberculosis of Senegalese soldiers. It is, indeed, a matter of the greatest interest to note the similarity between BORREL's findings and those now recorded. (See this *Bulletin*, Vol. 16, pp. 190–2.)

S. L. C.

LASNET. **Recherches entreprises en Cochinchine sur la tuberculose pulmonaire.**—*Bull. Office Internat. d'Hyg. Publique.* 1925. Jan. Vol. 17. No. 1. pp. 14–22. [3 refs.]

After a summary of the results of cutaneous tuberculin tests, corresponding in general terms with the figures already published by F. H. GUÉRIN, LALUNG-BONNAIRE and NGUYEN-VAN KHAI (see below), Doctor Lasnet passes on to the methods employed by the Tuberculosis Laboratory for the early diagnosis of tuberculosis in Cochin China. These methods, apart from the thorough clinical examination of cases, are as follows :—

1. Search for tubercle bacilli in sputum, stools, etc., after homogenization and centrifugation. It is to be noted that films studied after homogenization and centrifugation gave 11·66 per cent. more positives than direct films.
2. Radioscopy and radiography of the thorax.
3. Complement fixation (CALMETTE et MASSOL).

The author reports that this serological test was positive in 17 per cent. of cases in whom the examination of the sputum had proved negative. It appears to be the experience of some of the workers in England that the complement fixation test is sometimes positive in persons quite free from active tuberculosis, and while the findings of Dr. Lasnet are of great interest, they must not be taken as a final proof of the diagnostic value of the test. It appears, however, that the complement fixation results were often confirmed by minute clinical examination. An account is given of the work of popular education which appears to be developing on sound lines. The optimism of the author comes to the surface in such lines as the following: "Les principes hygiéniques . . . se gravent dans les cerveaux malléables des enfants et sont diffusés ensuite par eux au foyer familial." We have often heard a similar claim advanced by sanitary propagandists in this country, and the picture evoked by the phrase must be of comfort to the public lecturer on hygiene. The paragraphs on the "protection of those exposed to infection and the preservation of children" are worth careful study and show that good

work is being carried out in this important direction. Acting on the advice of the Pasteur Institute of Saigon and in co-operation with the Public Health Service, the Government selected the town of Cholon as the locality for a preliminary experiment, this town presenting a unit of a size and character suitable for the test. As a basis for investigation, it was thought advisable to carry out a thorough examination of the school children of Cholon, since it was clear that infected children must serve as guides to the sources of infection existing in the houses of the area under observation.

These children, on examination, fell into four categories, as follows :—

1. Normal healthy children of sound stock, 77·5 per cent.
2. Children with more or less definite signs of tracheo-bronchial infection, but without actual contact with "suspects," 14 per cent.
3. Children with signs suggestive of broncho-pleuro-pulmonary tuberculosis actually living in contact with infected persons, 7·8 per cent.
4. Children with open tuberculosis and positive sputum capable themselves of serving as foci of infection, 0·56 per cent.

Each category is dealt with according to its necessities, and an attempt is made to get the infected parents into suitable hospitals so as to eliminate sources of contact. It is interesting to learn that preparations are being made to apply to infants in Cochin China the B.C.G. vaccine of CALMETTE. The results of this experiment are certain to be of great interest and importance, and it is impossible to refrain from applauding the initiative of the French Colonial Medical Services in so promptly applying a method which has already proved simple and efficacious in experimental animals.

S. L. C.

GUÉRIN (F. H.), LALUNG-BONNAIRE & NGUYEN-VAN KHAI. **Epidémiologie de la tuberculose en Cochinchine.**—*Ann. Inst. Pasteur.* 1924. Oct. Vol. 38. No. 10. pp. 915–922.

This paper, of great interest and importance, should be read in the original by all those interested in the epidemiology of tuberculosis in the tropics. It confirms and amplifies the pioneer work of BERNARD, KOUN and MESNIL (1912) in Cochin China. The same observations, already published in the Transactions of the Fifth Biennial Congress of the Far Eastern Association of Tropical Medicine, were summarized in a recent number of this *Bulletin* (see Vol. 21, pp. 985–986), and so require no further notice here.

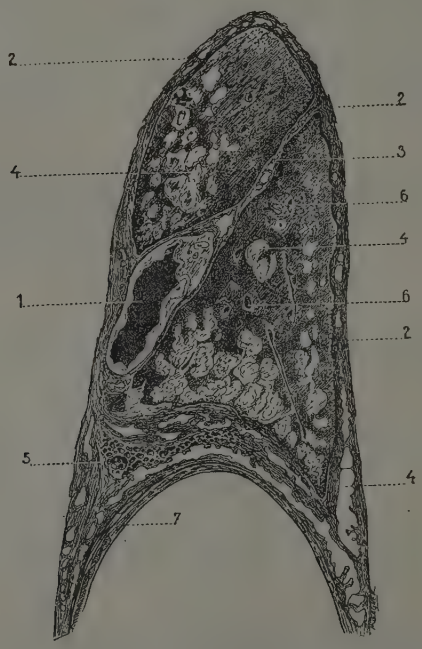
S. L. C.

PAISSEAU (G.) & LAMBLING (André). **Tuberculose de première infection chez l'adulte.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1924. Nov. 6. Year 40. 3rd Ser. Vol. 48. No. 31. pp. 1462–1472. With 1 text fig. [1 ref.]

The authors report in detail the clinical course and the post-mortem findings in a case of tuberculosis in a Senegalese soldier twenty years of age. The patient presented several clinical features of interest. It is unusual to find early cavitation in the tuberculosis of "virgin soil," yet a cavity formed early in this case and could be observed, on the screen, to contain both fluid and air. Again, when an acute phthisis reaches the stage of cavitation, it is usual to find that the sputum contains numerous tubercle bacilli; but in this patient the sputum was, except on one occasion, invariably negative to repeated

examination, though it did infect one guineapig out of two inoculated, causing a very slow and chronic form of generalized tuberculosis. The authors, in summing up a very complete account of the case, point out that the patient presented the three characteristics laid down by CAIN and HILLEMAND as diagnostic of "tuberculosis of primary infection." These are :—

1. A tuberculous process characterized by rapid caseation with a tendency to spread towards the periphery in the form of caseous pneumonia or bronchopneumonia ; and a rapid generalization from the primary area.
2. The presence of lymphatic nodes showing massive caseation.
3. Total absence of old lesions, either fibrotic or calcarious.



Tuberculous lesions in right lung of a Senegalese soldier, aged 20 years.

1. Cavity in middle lobe.
2. Adherent and infiltrated pleura.
3. Adherent and infiltrated interlobar pleura.
4. Caseous masses, pleura, bronchopneumonic foci, glands.
5. Areolar tissue.
6. Caseated bronchi.
7. Infiltrated diaphragm.

[Reproduced from *Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris.*]

A text figure illustrating the lesions found in the right lung is reproduced.

S. L. C.

PROTTEAU (P.). **Enquête sur la tuberculose par les cuti-réactions tuberculiniques dans un camp de nomades miséreux de l'annexe de Géryville (Hauts-Plateaux Oranais).**—*Arch. Inst. Pasteur d'Algérie.* 1924. June. Vol. 2. No. 2. pp. 200–203.

This study, dealing with an Emergency Camp for starving Arabs, is of interest in affording a contrast between a population of similar environmental and racial type during a period of exceptional privation and during normal life; since a similar study of the tuberculin reactions of nomadic Arabs had been made by Dr. JAME in 1922, before poverty and want had become acute (see this *Bulletin*, Vol. 20, p. 193). JAME recorded a "tuberculin index" of 48 per cent. in 1922. Protteau finds an index of 58 per cent. in February, 1923. The conditions of life during the famine camp are briefly but well described, and the increase in the tuberculin index is attributed to a fairly general "misère physiologique."

S. L. C.

MEIRELES (João Evangelista Quintão). **Defesa contra a tuberculose.**—*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 5. 9a. 10a. e Sessão de encerramento.) 1923. Aug. No. 4. pp. 229–238.

The author regards as the basis of a wise prophylaxis against tuberculosis the maxim of GRANCHER, "a double ration of air, a double ration of food, a reasonable amount of work." He has some sound observations to make on the prophylaxis of conjugal tuberculosis, which he evidently regards as more frequent than is generally supposed. He thinks marriage should be forbidden to diagnosed cases, and lays stress on the dangers of pregnancy, parturition and lactation to women with pulmonary lesions. He rightly points out that a sound organization for dealing with the tuberculosis of childhood would greatly minimize the incidence and mortality of the disease in later life; and he has good advice to offer on the subject of industrial tuberculosis. A comprehensive scheme, with milk-centres, crèches, hostels, open-air schools, hospitals and sanatoria, is outlined as desirable in the defence against tuberculosis.

S. L. C.

MATHIS (C.). **A propos de la vaccination des nourrissons noirs contre le tuberculose par le vaccin B.C.G.**—*Bull. Soc. Path. Exot.* 1924. Dec. 10. Vol. 17. No. 10. pp. 938–939.

This brief note on the application of Calmette's B.C.G. vaccine to 101 new-born infants of negro race during the first 10 days of life is published with no other intention than to make known to medical men that this mode of prophylactic vaccination is in use, and to solicit their help in following up results in the patients during their subsequent careers. At the same time, it marks another step forward, in the French Colonies, towards the prevention of a disease the ravages of which must, if left unchecked, assume tragic importance in these susceptible peoples, with the future developing of industrial and other enterprises in Africa. It may be pointed out that the French Colonies point the way in respect of tuberculosis, and that our Colonial Medical Services lag far behind in this respect. It was at the instance of CALMETTE that the splendid efforts to test out the distribution of

infection in North Africa by the tuberculin test were initiated some years ago; and it is to CALMETTE, once more, that this new effort to provide a logical remedy for the absence of acquired immunity in African natives is due. The future histories of these "vaccinated" negro children, if properly recorded, should provide valuable information as to how far an early infection by a living but non-virulent strain of tubercle bacillus is capable of affording protection against re-infection by virulent strains in after life.

S. L. C.

SOETOMO (R.). **Scrophuloderma bij Javanen.**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1925. Vol. 65. No. 1. pp. 9–12. With 4 figs.

Soetomo remarks that scrophuloderma, as well as surgical and ophthalmic tuberculosis, present themselves in Java as common diseases of adults, contrary to the conditions in Europe, where such affections prevail in childhood.

W. J. Bais.

TEPPAZ (L.). **Tuberculoses animales en A.O.F.**—*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 5. 9a. 10a. e Sessão de encerramento.) 1923. Aug. No. 4. pp. 217–220. [5 refs.]

Although for many years the veterinary inspectors at the abattoirs of Dakar, Saint-Louis, Kayes, etc., had failed to find any cases of tuberculosis in cattle, and the disease had come to be regarded as absent in French West Africa, PIERRE had noted two cases in 1905 in a series of over 2,000 animals examined (race not stated), and PECAUD had called attention, in 1912, to the existence of tuberculosis amongst a race of cattle in Dahomey, known as the "Lagunes," finding 22 infected animals in 497, or 4·4 per cent. It would seem, then, that although the disease would appear to be rare, it does, nevertheless, exist in A.O.F. Teppaz and NAINSOUTA have so far failed to find any cases at the abattoir of St. Louis. At Dakar, however, HECKENROTH has found tubercle bacilli in pus from the udder of a cow "in milk"; and, at Dakar also, CURASSON has reported two authentic cases of tuberculosis in zebus, one of the infected animals having belonged to a phthisical native owner. Since then, Teppaz and NAINSOUTA have each discovered two cases. Teppaz attempted to ascertain the *type* of the bacilli from his two cases, and the result was not what might have been expected, since the strain from a zebu with a benign localized tuberculous lesion was found to possess the characters of a bovine bacillus, while that from an animal suffering from acute generalized tuberculosis was found to be of "human" type. In view of the contradictory nature of these findings, Teppaz prefers not to draw any conclusion as to their nature. He is inclined to think that the zebus may be resistant to tubercle bacilli of both bovine and human origin, and that the few cases noted have been accidental infections. "For practical purposes," he says, "the zebus may be regarded as refractory to tuberculosis." He very wisely adds that experiments in the inoculation of these cattle with varying amounts of bacilli of varying origin might throw an interesting light upon this important question. Amongst pigs, too, tuberculosis is rare in the A.O.F. Only six authentic instances of pigs being found

infected at autopsy are on record. All these were belonging to "Portuguese" natives who had fed their pigs on ground spread with the ordure from the town. This practice has now been forbidden and, as a result, there are fewer animals infected. Though the point is not yet settled, it appears probable that the tuberculosis of the zebus is of human type. Dogs and cats have, so far, appeared free from the disease.

S. L. C.

CORREIA (Alberto Carlos Germano da Silva). **A tuberculose e os Sanatórios de Altitude em Angola.**—*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 5. 9a. 10a. e Sessão de encerramento.) 1923. Aug. No. 4. pp. 239–326. With 2 plates. [39 refs.]

This article falls naturally into two sections, the first consisting of a detailed discussion of the statistics of pulmonary tuberculosis in the different districts of Portuguese West Africa, so far as such statistics are available, while the second emphasizes the urgent need for the establishment of sanatoria, or at least a sanatorium, for the reception and hygienic treatment of phthisical patients. Here the author passes in review a number of hill stations, discussing the suitability of each as the site for a sanatorium. Altitude, climate and disease prevalence are, in each case, taken into consideration, and of the stations dealt with, Malange, Huambo, Silva Porto, Bela Vista, Caconda, Lubango and Humpata, the last-named is fixed on as being beyond question the most suitable, while its neighbour plateau of Palanca, presenting in general practically identical conditions, has one advantage over Humpata itself in that it is slightly better sheltered from strong winds.

F. S. Arnold.

TROPICAL OPHTHALMOLOGY: A REVIEW OF RECENT ARTICLES.—III.*

LIDS.—BISSET[1] strongly recommends the modification of Hotz's operation for trichiasis described in SWANZY's "Diseases of the Eye." She found Snellen's and Van Millingen's operations sometimes unsatisfactory, but has obtained consistently good results with this procedure. She states (1) that the operation is aesthetic and not in the least disfiguring; (2) it never fails if the first incision is correctly made; and (3) it has the advantage that no tissue is removed, and none is transplanted.

CONJUNCTIVA.—ELLIOT,[2] discussing the peculiarities that characterize epidemics of conjunctivitis in tropical countries, points out the various factors which make such epidemics differ widely from those seen in temperate lands. He further gives a short summary of the peculiar features of conjunctivitis of the gonococcal and membranous types, and of the same disease as met with in swimming bath epidemics and as a result of the action of lice. He finally discusses the rôle played by Koch-Weeks infections in tropical epidemics of conjunctivitis, and draws attention to the recent work of NICOLLE, CONSEIL, and CUENOD in the direction of preventive inoculation against this disease.

Conjunctivitis Infectiosa Necroticans (*Pascheff*).—STARK[3] has reported four cases clinically corresponding to this disease in which induration and swelling of the preauricular, parotid, and submaxillary glands occur accompanied by a rise of temperature. White spots, the size of a millet seed, appear on the tarsal and retrotarsal conjunctiva of one eye. Some of these spots are elevated, whilst others form ulcers; fresh crops tend to appear, and there is swelling of the lid. The conjunctival changes usually last about two or three weeks, but the glandular affection may persist for two or three months, and sometimes terminates in suppuration. PASCHEFF isolated an organism, the *Micrococcobacillus polymorphus-necroticans*, which produced typical conjunctival changes in the guineapig. No specific organism was detected in STARK's cases. Cases of monocular disease, clinically similar, have been described as squirrel plague conjunctivitis and agricultural conjunctivitis. The group closely resembles PARINAUD's conjunctivitis.

TRACHOMA.—As usual, this disease occupies a prominent place in the literature of tropical ophthalmology. The October and January numbers of the *Revue du Trachome* contain interesting papers on the distribution, prophylaxis, treatment, and economic importance of trachoma. REMLINGER and BERNARD[4] state that trachoma is not so very rife in Tangier. About 5 per cent. of the population are infected, as contrasted with 47 per cent. in Tunis. It is mostly a disease of adult life between the ages of 30 and 50. Jews are more often attacked

---

* For the second of this series see Vol. 21, pp. 976–983.

1 BISSET (M. R.). A Useful Operation for Trichiasis.—*Jl. Assoc. Med. Women in India.* 1924. Nov. Vol. 12. No. 4. pp. 12–14.

2 ELLIOT (Robert H.). Conjunctivitis in the Tropics.—*Brit. Med. Jl.* 1925. Jan. 3. pp. 12–14.

3 STARK (H. H.). Conjunctivitis Infectiosa Necroticans (Pascheff). Report of Four Cases corresponding clinically to this Condition.—*Jl. Amer. Med. Assoc.* 1924. Dec. 13. Vol. 83. No. 24. pp. 1915–1916. [8 refs.]

4 REMLINGER (P.) & BERNARD (L.). Le trachome à Tanger.—*Bull. Soc. Path. Exot.* 1924. Dec. 10. Vol. 17. No. 10. pp. 925–937. [20 refs.]

than other races, and women are specially affected. The type commonly seen is not associated with an excessive conjunctival discharge. They conclude that the disease is neither endemic nor epidemic in Tangier, but that it is most often imported. DEMARIA,[5] describing trachoma in the Argentine at the Seville Congress, stated that the country was infected by the flow of immigrants in 1880. The disease is now wide-spread, and is quite commonly found at high altitudes. Some centres, notably the provinces of Tucuman and Santiago del Estero, are more heavily infected than others. He thinks that trachoma is not an extremely contagious disease, and only spreads in a new country if great numbers of infected immigrants arrive at the same time. LEFORT[6] states that latent trachoma is very rife in Morocco and constitutes a grave danger there. Europeans are far from immune. Corneal lesions are much more common there than in Egypt. Secondary infections with Morax-Axenfeld bacillus were found in 35 per cent. of the cases, with Koch-Weeks bacillus in 25 per cent., and with the gonococcus in 5 per cent. These complications of trachoma occur at the end of September and in the beginning of October in the damp, or pomegranate, season. Affections of the lachrymal passages keep up the trachoma infection, and these must be carefully treated. CANGE and FOLEY[7] say that they have never observed acute trachoma in Algeria. They emphasize (1) the consistently bilateral character of the disease, and (2) the fact that it commences in and displays a marked predilection for the superior cul-de-sac. They note the prevalence of three types: (1) follicular, 13 per cent.; (2) papillary, 43 per cent.; and (3) lardaceous, 16 per cent. They remark that a considerable proportion of the cases may undergo a spontaneous cure without causing any deformity of the eyelids. MCMULLEN[8] is inclined to believe that the true explanation of the apparent prevalence of trachoma in Kentucky is the fact that much publicity has been given to the presence of the disease in that State. COLLIN,[9] reporting on the prophylaxis of trachoma in the schools of North Annam, concludes that the tropical light, together with the sand and dust in the air, pave the way for the infection of trachoma; flies, encouraged by filth and squalor, convey the infection; dirty cloths, dirty hands, and the use of a common kohl stick spread the disease in a family. The question of prophylaxis and treatment is bound up with that of cost. LACROIX[10] says that trachoma is not uncommon in Rouen, being brought there by foreign workmen who have come to the factories. There are two sources of the disease: (1) the Mediterranean element of Algerians and Spaniards; and (2)

---

5 DEMARIA (Enrique B.). La conjonctivite granuleuse dans la République Argentine. Dissémination et prophylaxie.—*Revue du Trachome.* 1925. Jan. Vol. 2. No. 1. pp. 27–55.

6 LEFORT. A propos du trachome au Maroc. Considérations cliniques. Traitment. Prophylaxie.—*Revue du Trachome.* 1924. Oct. Vol. 1. No. 4. pp. 124–135.

7 CANGE (A.) & FOLEY (H.). Le trachome en Algérie. Ses formes cliniques.—Son évolution.—*Arch. Inst Pasteur d'Algérie.* 1924. June. Vol. 2. No. 2. pp. 183–195. [10 refs.]

8 MCMULLEN (John). Trachoma.—*Southwestern Medicine.* 1924. Sept. Vol. 8. No. 9. pp. 425–426.

9 COLLIN. Ier Rapport sur la prophylaxie scolaire anti-trachomateuse. (Tournée du Nord Annam, Mai 1924.)—*Revue du Trachome.* 1924. Oct. Vol. 1. No. 4. pp. 142–144.

10 LACROIX (A.). Le trachome à Rouen.—*Revue du Trachome.* 1924. Oct. Vol. 1. No. 4. pp. 135–138.

the Belgian element. The Algerians are the main danger. The Belgian source is traceable to the Flemish in whose part of the country the disease is endemic.

Diagnosis.—VANCEA,[11] working on the lines described by SGROSSO, mentioned in previous articles, after having tested the complement fixation of 48 typical trachomatous subjects with adenoid antigen, came to the conclusion that this method has no value as an aid to the diagnosis of trachoma. MCMULLEN[8] thinks that the diagnosis of trachoma rests on conjunctival hypertrophy and the presence of trachoma granulations. To determine the presence of hypertrophy it is necessary to evert the lid and examine the small vessels of the palpebral conjunctiva; these should be readily traced from the ciliary border to the cul-de-sac; but, if hypertrophy is present, some portions of them will be obscured or buried beneath the abnormal tissue. ARANGO[12] mentions the same point. He warns against mistaking folliculosis for trachoma, an error easily made. Folliculosis is quite often found in young children convalescing from one of the infectious diseases of adolescence; and is often associated with enlargement of the tonsils. The condition predisposes to the development of trachoma. The membrane retains its elasticity and is free from any cicatricial process in folliculosis. He considers that chronic and non-secreting forms of trachoma are only slightly contagious, and that normal, healthy eyes, which are free from sources of irritation, may resist direct trachoma contagion.

Treatment.—Nothing novel has been evolved in the way of treatment. HAYES and OLDT[13] claim to have effected 70 per cent. of cures in Chinese in an average of 12·3 days per patient. They perform a thorough grattage with a 1–2,000 solution of mercuric bichloride after having scraped the conjunctiva with a blunt knife. They follow MCMULLEN's technique throughout. AUBARET, in a paper on the crushing of trachomatous granules, reviews the history of the treatment, and describes his special instrument, with the indications and contra-indications for its use. In a subsequent discussion ABADIE emphasized the fact that the granulations, found in trachoma, merely represent the tissue reaction to the pathogenic organism; remedial measures should be directed against the latter. LACAT testified to the value of brossage, or of puncture with a cautery, even in cases where the cornea is gravely affected.

General.—SÉDAN and MASTIER[14] have indicated the importance of the disease from the point of view of claims made under the Workmen's Compensation Act. They discuss their subject under three headings: (1) The direct inoculation of trachoma as a result of an accident; (2) the waking up of a latent trachoma by an accident; and (3) the coincidence of a developing trachoma with the occurrence of an accident. They are very sceptical as to the validity of the first head, and think that what generally happens is that the medical man

---

11 VANCEA (Petre). La réaction de fixation du complément dans le trachome avec un antigène adénoïdien.—*C.R. Soc. Biol.* 1925. Feb. 6. Vol. 92. No. 4. pp. 303–304. [1 ref.]

12 ARANGO (Miguel). Trachoma and Pannus.—*Proc. Internat. Conference on Health Problems in Trop. America.* 1924. pp. 646–656. [United Fruit Company, Boston, Mass.]

13 HAYES (C. A.) & OLDT (F.). Grattage in the Treatment of Trachoma.—*China Med Jl.* 1924. Nov. Vol. 38. No. 11. pp. 899–906. [3 refs.]

14 SÉDAN (J.) & MASTIER. Trachome et accidents du travail.—*Revue du Trachome.* 1924. Oct. Vol. 1. No. 4. pp. 138–141. [7 refs.]

who sees the case in the first instance neglects to observe, or to put on record, the presence of trachoma. TRIAUD and CARBONI[15] draw attention to the important financial considerations introduced into the recruitment of Northern African natives into the French service in view of the appalling prevalence of trachoma among them. There is the danger that the disease may be imported into France by the native members of the crews of French ships. Again, there is the important problem of the maintenance of individuals whilst under treatment for the disease, and of the pensions allotted to those who are invalided out of the service. France is adopting a vigorous policy to extend the hospitals in the infected areas, and to provide eye specialists to take charge of them. An energetic school campaign is being pressed at the same time. The key-note of all the work is contained in these words :—" The poison of trachoma is found in the tears, and the rôle of the fly in spreading the disease has been proved." SCHOUSBOË,[16] in a paper upon trachoma affecting French troops in North Africa, described the effect of the disease on recruitment under conditions of compulsory service. The trachomatous subject knows that his disease will secure his rejection from the army and therefore does not desire a cure ; he remains a source of danger to others in consequence. In SCHOUSBOË's opinion, trachoma does not attack a healthy conjunctival membrane, but only one whose resistance to disease is lowered. He makes various recommendations, and considers that trachomatous recruits might be accepted much more freely if these were carried out.

THE CORNEA.—FINDLAY[17] has conducted experiments which suggest that experimental *keratomalacia* may be due to a change in the secretion of the paraocular glands brought about by an absence of vitamin A in the diet. FLEMING has shown that human tears may have a powerful lytic effect on certain bacteria, and has termed the substance which causes the lysis " lysozyme." Experiments on rabbits, placed on a diet deficient in vitamin A, showed that a definite decrease in the lysozyme content of the tears coincided with the onset of keratomalacia. Unheated human tears were found effective in preventing keratomalacia, whereas tears heated to 70° C. were less effective, and physiological saline solution was useless as a preventive. The reviewer doubts whether the keratomalacia experimentally produced in animals is entirely identical with the disease he was familiar with in Madras. There necrosis of the substantia propria seemed quite commonly to precede any change in the corneal epithelium. WHITHAM[18] has reported two cases of *epithelial dystrophy of the cornea in diabetes*. FUCHS in 1910 first drew attention to this class of case. The affection is a dystrophy and not an inflammation. It occurs

---

15 TRIAUD & CARBONI. Note sur le trachome en Afrique du Nord ; son retentissement indigène ; importance de la lutte antitrachomateuse.—*Jl. Méd. de Bordeaux*. 1924. Aug. 25. Vol. 101. No. 16. pp. 703–705. [4 refs.]

16 SCHOUSBOË. Au sujet des mesures à prendre en vue de la prophylaxie anti-trachomateuse dans les contingents de l'Afrique du Nord. La lutte contre le trachome dans l'armée.—*Revue du Trachome*. 1925. Jan. Vol. 2. No. 1. pp. 15–23. [6 refs.]

17 FINDLAY (G. Marshall). A Contribution to the Aetiology of Experimental Keratomalacia.—*Brit. Jl. Experim. Path.* 1925. Feb. Vol. 6. No. 1. pp. 16–21. With 1 fig. & 2 charts. [7 refs.]

18 WHITHAM (Lloyd B.). Epithelial Dystrophy of Cornea an Ocular Manifestation in Diabetes.—*Amer. Jl. Ophth.* 1924. Oct. Ser. 3. Vol. 7. pp. 759–763.

most often in middle life, usually attacks females, is frequently associated with signs of glaucoma, and is slowly and steadily progressive. The aetiology is not understood. In both of WHITHAM's cases the corneal condition was degenerative rather than inflammatory, and was greatly benefited by efficient treatment of the diabetes. In one case there was a ring-shaped area of opacity which developed from a crescent situated half way between the centre of the cornea and the limbus. In the second case the cornea was generally steamy; in both the corneal epithelium desquamated far too readily. In one slight transitory hypertony was several times noticed, whilst in the other marked glaucoma was present.

CATARACT.—WRIGHT,[19] analysing 250 cases of cataract operated on by him by Barraquer's method, comes to the conclusion that phakoeresis is probably more valuable in selected cases than any other method yet introduced for the removal of the lens in its capsule; the operation is, however, inappropriate in a large number of cases. The procedure, in common with others which remove the lens in its capsule, deprives the vitreous body of the support afforded by the posterior layer of the capsule and the suspensory ligament; pathological changes in the posterior segment of the eye may occur in consequence. These changes are likely to be all the more dangerous to sight if the eye was not entirely healthy previous to operation. When applying the suction cup to the anterior layer of the lens capsule, great care must be taken to avoid inclusion of the iris. If the pupil is small, this stage of the operation may prove difficult.

An operation for cataract on a diabetic patient naturally causes greater anxiety to the surgeon than one when the constitutional condition is healthy. Very strict attention to aseptic technique is demanded, and the minimum amount of trauma should be inflicted. LIPPMANN[20], recording the statistics of 63 operations for cataracts in diabetic patients, states that two eyes were lost, one from staphylococcal infection, and the other from a mycotic iridocyclitis. Two more cases of iridocyclitis had occluded pupil, while five more had iritis but ended well. Two cases developed retrobulbar neuritis, one immediately after the healing of the wound, and the other a year later. One case of diabetic retinitis and six of haemorrhage into the anterior chamber occurred. Detachment of the retina took place in two patients. The result was bad in 16 cases out of the 63. The practice of blocking the branches of the facial nerve as a preliminary to the extraction of cataract is spreading, and ROBISON[21] has published a valuable article upon the technique.

GLAUCOMA.—SMITH,[22] writing from his experience of the disease amongst the Chinese, states: "The question 'What are the indications for operation in glaucoma?' can be answered in three words, viz., 'A sure diagnosis'." This advice is, unfortunately, too often neglected.

---

19 WRIGHT (R. E.). A Series of 250 Cataract Extractions by Barraquer's Method.—*Brit. Jl. Ophth.* 1925. Feb. Vol. 9. No. 2. pp. 57–63.

20 LIPPMANN (Waldemar). Operationsresultate bei Cataracta diabetica.—*Med. Klin.* 1921. No. 37. pp. 1115–1116.

21 ROBISON (J. Mathews). Some Observations on Blocking of the Fifth and Seventh Nerves as an Accessory in Cataract Operations.—*Arch. of Ophth.* 1924. Vol. 53. pp. 570–578.

22 SMITH (D. V.). Indications for Operation in Glaucoma.—*China Med. Jl.* 1924. Oct. Vol. 38. No. 10. pp. 816–820.

General Diseases. *Kala azar.*—Ling[23] and Lee[24] describe the retinal haemorrhages which they have observed in kala azar patients. These appear to have been related to the general anaemia associated with the constitutional disease. Xerosis and keratomalacia were also met with; these conditions in Eastern countries are closely connected with the lowered nutrition which is one of the outstanding features of kala azar.

Dracontiasis.—Wright[25] removed an encysted guinea-worm from the orbit of a Hindu female child, aged 5. The identification of the specimen was made by Professor Leiper. A case of this nature is worth noting on account of its rarity.

Accidental Injuries.—Discussing injuries to the eyes of native mine workers in South Africa, Napier[26] remarks that the chief features displayed are: (1) There is marked delay in seeking advice; (2) severe injuries may sometimes be comparatively painless; (3) over-treatment may occasionally be a source of irritation.

Miscellaneous.—MacCallan,[27] describing the ocular discomfort experienced by Europeans subjected to the influences of sun, dust and wind in Egypt, states that the hot climate is likely to cause fatigue and ill-health; trifling errors of refraction and slight degrees of heterophoria then exert effects quite out of proportion to their actual severity. Europeans should be very careful to ensure that their children do not acquire a conjunctival infection from native attendants. A seasonal hot-weather rise in acute ophthalmias (especially gonorrhoeal) regularly occurs in Egypt. Gonorrhoeal ophthalmia is usually non-venereal, the infection spreading from eye to eye.

Sir Arnold Lawson,[28] in his Presidential Address to the Ophthalmological Section of the Royal Society of Medicine, discussed the value of different tints in glasses, a subject of importance to residents in the Tropics. He stated that the eye is adapted to endure without harm the ultra-violet and infra-red radiation of ordinary daylight under normal circumstances. Any danger arising from the subjection of an eye to intense sunlight would seem to result from the red rather than the violet end of the spectrum. Under certain conditions of health prolonged exposure to even moderate degrees of light may be harmful, because the natural resistance may be lowered. When considering the value of the tint to be prescribed, it is important to remember that this is greatly affected by the thickness of the glass supplied by the optician. The effect of tint upon the temperament of the patient, too, must be taken into account. Investigation showed that all the tints compounded with Crookes' glass give good protection against ultra-violet rays, but are not so efficient as the corresponding shade of Fieuzal as regards the blue and violet end of the visible spectrum.

---

23 Ling (W. P.). Ocular Changes in Kala Azar in Peking.—*Amer. Jl. Ophth.* 1924. Nov. Ser. 3. Vol. 7. pp. 829–834.

24 Lee (T. P.). Ocular Findings in Kala Azar in Central China.—*Amer. Jl. Ophth.* 1924. Nov. Ser. 3. Vol. 7. pp. 835–837.

25 Wright (R. E.). Encysted Guinea-Worm of the Orbit.—*Indian Med. Gaz.* 1924. Sept. Vol. 59. No. 9. pp. 458–459.

26 Napier (F. H.). Some Injuries to the Eyes of Native Mine Workers.—*Med. Jl. S. Africa.* 1925. Jan. Vol. 20. No. 6. pp. 149–152; and *S. African Med. Rec.* 1925. Feb. 14. Vol. 23. No. 3. pp. 43–48.

27 MacCallan (A. F.). Ophthalmology in Egypt.—*Brit. Med. Jl.* 1925. Mar. 21. pp. 551–552.

28 Lawson (Arnold). Tints and their Value.—*Proc. Roy. Soc. Med.* (Sect. of Ophth.). 1925. Apr. Vol. 18. No. 6. pp. 24–32.

Fieuzal, Nos. 3, 4 and 5, afford the most powerful protection of all known tints with regard to the violet end of the spectrum, more even than Peacock Blue. Crookes' A 2 provides substantial protection from ultra-violet radiation without seriously impeding the luminous rays. Crookes' B gives good protection throughout the whole length of the spectrum and can be recommended for general use. Peacock Blue affords an infinitely larger range of protection than any other tint; it excludes all the ultra-violet and some of the violet rays at one end of the spectrum, and all the yellow, orange, and red rays at the other. Amber is the least efficient of all tints. Lawson advises that Fieuzal, 4 or 5, or Peacock Blue, may be prescribed for furnace-workers, Crookes' A for aphakic eyes and Peacock Blue for persons suffering from active inflammatory disease of the choroid or retina.

An interesting paper has been written by FERNANDO[29] on *fundus lesions amongst the Filipinos.* The paper was inspired by the work done in Madras, and is claimed to be the first effort of the kind made in the Philippine Islands. The difficulties of such an investigation amongst an ignorant population are emphasized. The dark pigmentation of the people leads to the appearance of a fundus characteristic of dark-skinned races. The nasal portion of the visual field is wider in the Filipinos than it is in Caucasians, owing to their low, flat nose bridges; consequently, the normal perimetric chart requires to be modified. As in South India, syphilis is the most frequent cause of optic atrophy. Nephritis plays a rôle similar to that which it does in Europe. No case of typical diabetic retinitis was encountered, and, though cataract is very common, glycosuria has very seldom been observed among the patients suffering from it. The eye signs of beriberi appear to be milder than those met with in Japan and elsewhere, and central scotoma has not hitherto been observed. No case of quinine amblyopia or of tobacco amblyopia has been encountered, though malaria is common, and tobacco smoking is apparently almost universal. Pyorrhoea is very common among the Filipinos, but its influence on eye trouble has not yet been traced. Cases of acute congestive glaucoma are more frequently seen at the hospital than those of the simple chronic form; this is believed to be due to the natives resigning themselves to blindness as an inevitable result of advancing years. FERNANDO has found night-blindness as a definite symptom of beriberi; it disappears when that disease is taken in hand. Epidemic night-blindness, due to vitamin deficiency, is also seen. An interesting observation is recorded of a ball-player, who after a game suffered from a sun scotoma similar to that met with in eclipse-gazing; he had been facing the sun during the game. There are a few albinos in the islands. The unclassifiable cases of optic atrophy puzzle FERNANDO just as they do workers in other tropical countries.

H. Kirkpatrick.

---

29 FERNANDO (Antonio S.). Observations on Fundus Lesions among Filipinos. —*Amer. Jl. Ophth.* 1925. Mar. Ser. 3. Vol. 8. No. 3. pp. 203–207.

HELMINTHIASIS.

KOBAYASHI (Harujiro). **On the Animal Parasites in Korea.**—*Japan Med. World.* 1925. Jan. 15. Vol. 5. No. 1. pp. 9–16. With 1 map in text. [34 refs.]

The paper gives a general review of the parasites infesting man in Korea. Of these the most noteworthy is *Paragonimus westermanii*, which occurs all over the peninsula. During 1923 an official survey showed that 9·4 per cent., or 16,866 out of 180,351 Koreans, and 0·1 per cent., or 10 out of 1,154 Japanese, were infected. Moreover, dog, cat, hog, are also definitive hosts, and one case is on record of infection in cattle. The author has found the parasite in a tigress, 3 panthers, 1 wolf and 1 fox. No difference in structure between the forms in the lower animals and those in man could be detected.

Clonorchis sinensis prevails in Southern Korea. New localities are given for the first intermediate host *Bulimus striatulus* [? *Bythinia striatula*], viz., Heitaku, Toto and Taikyu. In Heitaku, *Pseudorasbora parva* and *Leucogobio striatus* and in Taikyu *Sarcocheilichthys morii* were found infested with the encysted larvae. *Metagonimus yokogawai* is, especially in the southern part, widely distributed in Korea. In the early literature *Heterophyes heterophyes* infections in Korea are noticed, but it appears uncertain to what extent these were Metagonimus. The author has observed in the wolf a case of Heterophyes indistinguishable from *H. heterophyes*. No case of *Schistosoma japonicum* has yet been recorded for Korea.

Taenia saginata is very widely distributed. A few records of *Taenia solium* depend on identification of the eggs in faeces, and as they resemble *T. saginata* very closely these identifications are of doubtful validity. INOBA mentions the occurrence of *T. solium* in the most northern part of the peninsula. *Taenia echinococcus* occurs, but is uncommon in man. *Dibothriocephalus latus* is rare, but the author reports a case in a child of two years of age. *Sparganum mansoni* is very common in animals, but only three cases are recorded in man in Korea. In mammals usually only one large parasite is found, but in snakes several occur in one host. The author thinks that in the mammal the infection may be a secondary one due to the eating of the younger plerocercoids in snakes, for these do not mature in the intestine, but penetrate the wall and remain in the serous membrane at the same stage. In Korea the frog is not infected, whereas in Japan it is a frequent host. The adult worm occurs in Korea in dog, wolf, fox, cat, tiger, leopard and *Nyctereutes koreensis*. The author inclines to the view that the species is the same as *Dibothriocephalus decipiens*, Diesing.

Strongyloides intestinalis occurs at times in patients suffering from diarrhoea. Hookworm is common, but is rarer in the northern region; both species are present in Korea, but *N. americanus* is the rarer form. *Ascaris lumbricoides* is uniformly prevalent. It occurs also in 20 per cent. of the hogs. *Trichuris trichiura* is likewise common, but does not appear to be so intense as Ascaris infection in the northern part. *Trichostrongylus orientalis* is common in the southern area, but is generally less numerous than hookworm. In Seoul it often infests Japanese more intensely than Koreans. Filariasis and elephantiasis occur in north and south Chusei-Do. *Trichinella spiralis* is unknown. Two cases of *Rhabditis hominis* have been recorded in

Seoul by the author. *Oxyuris vermicularis* is of general occurrence, but is rarely found in faecal examinations. A series of statistical tables summarizing the results of previous work concludes a useful résumé.

R. T. Leiper.

EASMAN [? EASMON] (M. C. F.). **Helminthiasis in the Sierra Leone Protectorate.**—*Jl. Trop. Med. & Hyg.* 1924. Nov. 15. Vol. 27. No. 22. pp. 305–307.

While in charge during part of 1923–4 of the two principal gaols in the Central and Southern Provinces of the Sierra Leone Protectorate and of the Bo school, a survey was made by the author for evidence of common helminths occuring in the blood, urine and faeces. He found in the blood: *F. bancrofti, loa* and *perstans* embryos; in urine: *S. haematobium*; in faeces: Ankylostoma, Ascaris, Strongyloides, Oxyuris, *Trichuris trichiura* and taeniae. The embryos of *F. bancrofti* appeared in 25 per cent. of the smears examined, and in 16 cases they occurred in daytime. *F. loa* was seen in two cases and *F. perstans* in one.

Although he had typical specimens of *Physopsis globosa* he was unable to find these or, indeed, any other recognized carrier at the Bo school or Kennema. 46 per cent. of the series of faecal examinations showed presence of hookworm eggs (84 per cent. at the Moyamba Prison). *Ascaris lumbricoides* occurred in 41·7 per cent., Strongyloides 14·3 per cent., Trichuris 4·2 per cent. *O. vermicularis* was a rare infection. The cases of Taenia were chiefly among Syrians from Beyrout. The helminth infections seen were unassociated with clinical symptoms. A study of the history of the cases of infection with *Schistosoma haematobium* among the boys attending Bo school for the sons of Paramount Chiefs leads the author to conclude that the infection is not acquired locally.

R. T. L.

KHALIL (M.). **The History and Progress of Anti-Ankylostomiasis and Anti-Bilharziasis Work in Egypt.**—*Reports and Notes of the Public Health Laboratories, Cairo. No. 6.* 1924. pp. 1–77. With 12 plates. [236 refs.]

This is an account of the work done in Egypt up to the end of 1923. After a brief historical review, Khalil describes the inauguration of the anti-ankylostomiasis campaign in 1913 under Looss. The committee was not only to advise on investigations necessary for prophylaxis, but to suggest treatment and collect data. A tent hospital, accommodating 100 in-patients, was established for the purpose of treatment. This was in use up till 1915 when, owing to the war, the committee's activities were discontinued. The reconstructed committee, in 1919, had the attack on bilharziasis also included in its purview. It decided to attack the two diseases on the lines of treatment, investigation and survey, propaganda and experimental work. Treatment was carried out in 6–7 annexes to general hospitals; and details of the staff and equipment of these are given. The work for 1920–1923, during which period over 110,000 patients were examined and treated in the annexes alone, is considered in detail.

T. W. M. Cameron.

KHALIL (M.). **Incidence of Bilharziasis and Ankylostomiasis amongst the Inhabitants of Nag Hamadi District.**—*Reports and Notes of the Public Health Laboratories, Cairo. No. 6.* 1924. pp. 183–185.

In order to estimate the extent of the infections with these diseases in the Nag Hamadi district of Quena Province (Upper Egypt) an examination of the urine and stools of a fair sample of all classes of the population was made. About 75 per cent. were found to suffer from urinary bilharziasis, while only 44 per cent. harboured hookworms. Khalil considers that this wide-spread infection with bilharzia is due to the numerous canals and drains in the neighbourhood which have been constructed in the absence of other irrigation schemes. Snails of the genus *Bullinus* were found in fairly large numbers, but *Planorbis* was absent.

T. W. M. C.

FAUST (Ernest Carroll). **Some Facts regarding the Relation between Nightsoil Disposal in China and the Propagation of Helminthic Diseases.**—*Amer. Jl. Trop. Med.* 1924. Nov. Vol. 4. No. 6. pp. 487–501. With 1 plate.

The author shows how the general utilization of human faeces for manurial purposes in China and the Far East, together with improper personal hygiene, is accountable for much of the helminthic infection of the people. He then deals with those worms which do not require an intermediate host, such as Ascaris, Trichuris, Oxyuris, Strongyloides and Hymenolepis, pointing out the resistance of their ova to various chemical agents. He next treats of those which require one or more larval hosts, for example, *Taenia saginata, T. solium* and *Clonorchis.* Thirdly, those with reservoir hosts are mentioned, though constituting rather a sub-group of the second heading than a definite group of their own. The dog and cat, as ubiquitous scavengers, form a serious problem as assisting in the propagation of certain trematode and cestode infections in China.

The author suggests the lines on which remedial measures should be undertaken, bearing in mind the fact that human manure is in China an economic necessity. Firstly, adequate cooking of food, which may be contaminated either directly by manure or indirectly by serving as intermediate host for the worm; secondly, boiling of water, possibly polluted by faecal matter; thirdly, therapeutic prophylaxis; this can have a use only where there is local heavy infection which may be attacked by a specific anthelmintic. Sterilization of nightsoil is but a counsel of perfection, while educational measures inculcating the proper use of latrines, instruction in the disposal of nightsoil, in personal hygiene, and in the preparation of food, must not be forgotten.

H. Harold Scott.

KHALIL (M.). **The Relation of Sewage Disposal to the Spread of Helminth Infections in British Guiana. (A Report of the Filariasis Commission in British Guiana.)**—*Jl. Helminthology.* 1924. Sept.-Nov. Vol. 2. Nos. 4 & 5. pp. 175–190. With 8 figs. [11 refs.]

The various types of sewage disposal in use in British Guiana are considered in relation to the spread of helminth infection, viz., the

pit latrine, pail closet, latrine over drainage trenches, septic tanks. A detailed study of the septic tank effluents showed that helminth eggs, including hookworm eggs, were discharged in a viable state, and it is urged that methods applicable in temperate zones must be scrutinized before adoption in tropical regions in view of the different problems which have to be dealt with.

R. T. L.

BOECK (William C.). **A Survey of Two Hundred and One Privies for Intestinal Parasites.**—*Amer. Jl. Public Health.* 1924. Oct. Vol. 14. No. 10. pp. 839–841. [5 refs.]

The contents of 201 privies in a southern city were examined for intestinal parasites and showed a number of worm infections. By far the largest number were due to Ascaris and Trichuris, but free living nematodes of the genus *Diplogaster* were very prevalent. The ova of these forms resembled those of ankylostomes. The percentages of infections in the 201 privies were: Taenia, 0·5 per cent.; Ascaris, 3·5 per cent.; Trichuris, 2·9 per cent.; Diplogaster, 25·9 per cent.; unidentified ova (probably Diplogaster), 18·4 per cent.

R. T. L.

JOYEUX (Ch.). **Action pathogène des helminthes.**—*Jl. Méd. Français.* 1924. Sept. Vol. 13. No. 9. pp. 362–365. With 3 figs.

The pathological effects of helminths are conveniently grouped under the two main headings of Local and General. In the second group the actions of helminthic toxins are considered as they affect certain systems, following the lines of SIMONIN's work. It is stated that two kinds of lesions are produced according as the intoxication is acute or chronic, the former resulting in congestive and haemorrhagic phenomena, the latter more in degenerative conditions with reactionary fibrosis.

H. H. S.

HALL (Maurice C.) & SHILLINGER (Jacob E.). **Critical Tests of Miscellaneous Anthelmintics.**—*Jl. Agric. Res.* Washington. 1924. Oct. 1. Vol. 29. No. 7. pp. 313–332. [43 refs.]

By the term "critical tests" the authors imply the administration of definite doses of anthelmintics to animals, the collection subsequently of all worms passed, the post-mortem examination of the animals and collection of the remaining worms. The relative proportion of each species of worm passed to the total is a gauge of the efficacy of the anthelmintic in question. The article comprises accounts of 15 series of investigations, each followed by a discussion. A few remarks may be made on some of the most important of the series:—

1. Dogs harbouring worms were given a combination of carbon tetrachloride, chenopodium and arecoline hydrobromide. The results did not fulfil the theoretical expectations, and the decision arrived at was that in practice it would be better to give the first or the first two drugs for ascaris and hookworms, and the arecoline a week or two later.

2. Benzyl-phenol proved to have only some 5 per cent. efficacy against hookworms, and both it and thymol were found to be inferior to carbon tetrachloride.

3. Ethylene dichloride, $C_2H_4Cl_2$, has a slight effect on hookworms in dogs, but considerably less than carbon tetrachloride, CCl_4, the result being apparently dependent upon the halogen concentration, chloroform, $CHCl_3$, holding an intermediate position as regards efficacy.

4. Ferrous sulphate, on account of its low toxicity and slow passage through the intestine and its entry into the caecum, should, theoretically, prove useful for Trichuris, but this was not supported in practice.

5. Tartar emetic intravenously was also tried for Trichuris in dogs, but single doses, even of 1 gr., were ineffectual as an anthelmintic, and there was grave risk of its toxic action.

6. Chenopodium and magnesium sulphate together gave good results, and the simultaneous administration of the saline did not diminish the anthelmintic effect of the chenopodium and, at the same time, protected from the toxic action of the latter.

7. Tests on a large scale with carbon tetrachloride for treating worms in sheep have been carried on, but the experiments are not yet completed.

Carbon tetrachloride was found to be 33 per cent. effective against tapeworms, which is a better result than previous writers have recorded.

8. As regards worms in horses, arsenic was tried because this and copper sulphate had proved useful in controlling stomach worms in sheep and goats, but the results were disappointing, and the authors conclude that carbon bisulphide and carbon tetrachloride, and perhaps chenopodium, are superior to arsenic for this purpose.

9. Novarsenobenzol, both subcutaneously and intravenously, proved of little, if any, use in the treatment of Trichuris in the dog.

The above are the most important of the results recorded in this article; many other points have necessarily been omitted, and those interested should consult the original paper.

H. H. S.

FÜLLEBORN (F.). **Referat ueber den jetzigen Stand der Therapie (besonders Chemotherapie) bei exotischen Wurmkrankheiten.** [The Present Position of Therapy in Exotic Worm Infections.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1924. Dec. Vol. 28. No. 12. pp. 526–535.

The author, after some pertinent introductory remarks on the difficulties of testing and gauging the results of new anthelmintic drugs, sums up by saying that, apart from the introduction of carbon tetrachloride for hookworm, advancement in the treatment of exotic helminthic affections is practically limited to antimony for schistosomiasis and dracontiasis, and emetine as a reserve for the former of these.

H. H. S.

LEACH (C. N.). **The Mode of Action of Carbon Tetrachloride.**—*Far Eastern Assoc. Trop. Med. Trans. Fifth Biennial Congress Singapore 1923.* pp. 239–249. With 3 plates. [13 refs.]

Carbon tetrachloride is soluble in 1,250 parts at 25° C.; it boils at 46·25° C. The drug was discovered by REGNAULT in 1839, but since 1867 (SANSOM) it had seldom been mentioned in medical literature until HALL revived its use in 1921. It is a dangerous drug if given in

association with alcohol. The common impurities are carbon bisulphide and occasionally phosgene (carbonyl chloride). All samples, from whatever source, are regarded by the Bureau of Science, Manila, as impure and the following routine for the purification of the product is followed: The CCl_4 is refluxed with an oxydizing solution of sulphuric acid and potassium dichromate, distilled off, treated with 15 per cent. solution of potassium hydroxide with agitation, separated, washed with water, dried with calcium chloride and carefully redistilled in glass. Recent experiments in Bilibid prison, Manila, indicate that CCl_4 does not produce the serious effects on the liver or kidney functions which have been reported. 100 prisoners were treated. The maximum dose given was 1 cc. per 5½ kilogm. of body weight. The average dose was 8·96 cc. The extremes used were 6·2 cc. and 12·5 cc. No symptoms developed which required treatment for their relief. The usual symptoms of vertigo and drowsiness are charactized by the author as "normal." The patients usually passed off into a quiet sleep lasting less than an hour or two. The cathartic action of the drug was marked and in the majority of cases the bowels moved in from 1 to 5 hours. In less than 1 per cent. was any cathartic after treatment necessary. CCl_4 is to be regarded as an intestinal irritant, and this action is increased by the prior administration of a saline cathartic. It has also a stimulant effect on the liver as evidenced by the occasional presence of bile in the urine and stool following its administration.

R. T. L.

CHANDLER (Asa C.) & MUKERJI (A. K.). **Notes on Carbon Tetrachloride as an Anthelmintic.**—*Indian Med. Gaz.* 1925. Feb. Vol. 60. No. 2. pp. 61–69. [30 refs.]

In dosage of 3 to 5 cc. carbon tetrachloride can be regarded as distinctly safer than oil of chenopodium and as safe as any effective anthelmintic provided the drug is of a certain standard of purity; is accompanied or followed by a saline purge; is not administered to badly under-nourished or very weak individuals; and cirrhosis or other liver derangement is regarded as a contra-indication. When it is used fats and alcohol should be avoided and a diet rich in carbohydrates but poor in fats prescribed. It is well tolerated by young children and is safe for pregnant women. In eliminating *Necator* it is distinctly superior to chenopodium, whereas it is equal or slightly inferior to this drug in its effects on *Ancylostoma.* Capsules are not required, and it enjoys the advantage of great simplicity of administration. The authors recommend the administration of CCl_4 as a 70 minim dose in skimmed milk followed by a saline purge. A combination of CCl_4 with chenopodium is very effective and is especially valuable where Ascaris infections are common. Alone CCl_4 is a little less effective than either chenopodium or santonin against Ascaris. It is more potent against Oxyuris than any other anthelmintic tried by the authors, and promising results have followed enemata of the drug in warm milk; this with a dose by the mouth is considered worthy of a more extensive trial. CCl_4 has little or no action against Trichuris, Strongyloides or tapeworms.

R. T. L.

BLISS, Jr. (A. Richard). **A Pharmacodynamic Study of the Anthelmintic Properties of Two Oils of Chenopodium.**—*Jl. Lab. & Clin. Med.* 1925. Mar. Vol. 10. No. 6. pp. 456–461. [29 refs.]

A concise and instructive paper designed to demonstrate scientifically the relative values of oil of chenopodium from different sources from the anthelmintic standpoint and to settle the controversy thereanent. The samples employed were: (1) "Maryland oil" distilled from plants from Carroll County, Maryland. (2) "Western oil" from plants cultivated in Adams County, Illinois. (3) "Wild Western oil" from cultivated wild wormseed plants from Adams County. The common ascaris of the dog was used as the test worm. The oil was administered in soft elastic capsules—5 minims for a dog weighing 10 lb. or less, 10 for one between 10 and 20 lb., 15 for one between 20 and 30 lb., 20 minims for those over 30 lb. The dose was followed immediately by an ounce of castor oil, which is not merely purgative but protective, distributing the drug over a larger surface and promoting elimination and thus preventing toxic symptoms. The number of worms passed for five days after treatment and those found after killing the animal at the end of the fifth day were added together and the percentage of the former to the whole is recorded as the "efficacy" of the preparation used. The results, as shown in the subjoined Table, demonstrate that in their effects the differences are not great, the Maryland oil occupying a position intermediate between the two "Western oils":—

No.	Oil.	Number of Dogs.	Number Ascarides in stools.	Number Ascarides post-mortem.	Per cent. efficacy.
1.	Western oil	24	263	4	98·50
2.	Wild Western oil ...	18	155	6	96·27
3.	Maryland oil	20	188	4	97·91

H. H. S.

DORAN (G. W.). **Oleum Chenopodii as an Anthelmintic.**—*S. African Med. Rec.* 1924. Oct. 25. Vol. 22. No. 20. pp. 474–476.

The author carried out tests to determine the best results of oil of chenopodium as an anthelmintic according to: (1) The preliminary preparation of the patient; (2) the dosage; (3) the vehicle; (4) the nature of cathartic and the time of its administration after the drug.

Preliminary purge and starvation were not found beneficial, but a light meal of bread and milk or rice some 12 hours before taking the drug is recommended. The dose varied according to age, sex and general condition, but the author noticed that unpleasant effects were less in evidence if the dose was divided into two portions taken at an interval of an hour. To disguise the objectionable taste and smell the chenopodium is best given in gelatin capsules or in emulsion with Aq. menth. pip.

A saline purgative was given at intervals varying from a half to three hours later, and the best results were obtained in children when it was given after an interval of 1½ hours, in adults after 2 hours. Oil of chenopodium, he thinks, should not be combined with other

anthelmintics. He does not agree that pregnancy is a contra-indication; he has given it in 5 minim doses in a large number of cases without any untoward effects.

H. H. S.

SMILLIE (W. G.) & PESSÔA (S. B.). **A Study of the Anthelmintic Properties of the Constituents of the Oil of Chenopodium.**—*Jl. Pharm. & Experim. Therap.* 1924. Dec. Vol. 24. No. 5. pp. 359–370. [8 refs.]

Experiments were undertaken, first, to establish the active anthelmintic principle of oil of chenopodium, and secondly, to determine the optimum dosage and method of administration. The chemical composition of the drug is found to be: (1) Ascaridole, varying in different samples from 45 to 70 per cent. (2) Ascaridole glycol and ascaridole glycol anhydride, about 5 per cent. (3) A mixture of terpenes—cymene, terpene, oil of phellandrine, limonene, etc.—making together about 30 per cent. of the whole.

It was found that the lighter hydrocarbons, containing no ascaridole, have little anthelmintic power and only a slight toxic action on dogs. Ascaridole is the active principle and is toxic, causing in man nausea, headache, giddiness, tingling and numbness in the extremities, singing in the ears and drowsiness. If the ascaridole is transformed into its glycol and anhydride, as it is by the action of heat, the toxic effects are greatly reduced but its anthelmintic powers are lost altogether. Owing to the variability in the amount of ascaridole present in different samples of oil of chenopodium the active principle itself is better than the whole drug, but it is expensive.

As regards dosage, 1 cc. was found to be the best for adults, given on an empty stomach and followed in half an hour by a saline purge of magnesium sulphate. Ninety-five per cent. of the hookworms were thereby expelled, the majority being *Necator*. *Ancylostoma* was found to be more resistant to the drug. The effects proved better when the ascaridole was given as a single dose than when divided into two or more smaller doses.

H. H. S.

KREITMAIR (Hans). **Ueber Digenea und das daraus hergestellte Wurmmittel Helminal.** [Digenea and the Vermifuge obtained from it.]—*Muench. Med. Woch.* 1925. Jan. 9. Vol. 72. No. 2. pp. 56–57. [10 refs.]

Digenea simplex, the source of helminal, is a red alga found on the coasts of Eastern Asia. The author tested the action of helminal on various worms *in vitro*, namely, *Nematoxys ornatus* of the frog, *Lumbricus terrestris*, Ascaris from the pig and *A. mystax*. With a concentration of the dried extract of 1 in 10,000 the worms became more lively in their movements, trying to raise their heads out of the fluid, and some might even escape from the container. In larger doses a convulsive effect was produced. There is a wide margin of safety in the use of this drug, for by animal experiment it was found that 10 gm. of a concentrated extract per kilogramme body weight proved quite harmless to the host.

H. H. S.

WERNER (F.). **Vergleichende physiologische Studien ueber die Wirkung von Helminal.**—*Klin. Woch.* 1925. Feb. 12. Vol. 4. No. 7. pp. 311–312. With 1 text fig. [5 refs.]

The author tested helminal by subjecting it to the same experiments as TRENDELENBURG carried out for santonin, and noting the effect of various dilutions of the drug in Ringer's solution on isolated strips of muscle of the *Lumbricus terrestris*. With santonin there was an increase of tonus, of the degree and of the rate of contraction of the muscle. Helminal, on the contrary, had none of these effects, and therefore, it is stated, the claims made from the pharmacological point of view as to its efficacy cannot be substantiated for this as for santonin.

H. H. S.

KHALIL (M.). **The Control of Bilharziasis in Egypt.**—*Reports and Notes of the Public Health Laboratories, Cairo. No. 6.* 1924. pp. 95–157. With 1 plate. [18 refs.]

In addition to the measures recommended by LEIPER for the control of this disease in Egypt, Khalil has examined the effects of copper compounds on the intermediate host. He finds that copper sulphate in very high dilutions is fatal to snails; but if his laboratory experiments are confirmed in the field, a concentration of one in two to three hundred thousand will be necessary, owing to choking of drains with vegetation. Colloidal copper in a dilution of 1 in 4 million of Nile water was found to kill all molluscs in three days.

Khalil finds that copper sulphate in a dilution of 1: 100,000 has no effect on the germination of cotton, maize and wheat. He recommends the use of copper in the pools left in the dry irrigation channels. His other recommendations agree with those of LEIPER (1918).

T. W. M. C.

KHALIL (M.). **Parasitic Diseases at Saft el Enab Village.**—*Reports and Notes of the Public Health Laboratories, Cairo. No. 6.* 1924. pp. 159–182. With 10 plates.

The village of Saft el Enab was the scene during 1922 of a serious outbreak of what Khalil shows was intestinal bilharziasis. A systematic examination of the stools and urine of the inhabitants was made and ten species of helminths were recognized. Only 4·4 per cent. of the inhabitants were free from infection; 73 per cent. harboured *S. haematobium*, 34·7 per cent. *S. mansoni*, 64 per cent. ascarids, and 16·6 per cent. *A. duodenale*. The other parasites, found in small numbers only, are hymenolepis, taenia, enterobius, trichocephalus, trichostrongylus and strongyloides.

Khalil considers that the deaths which were the cause of the investigation were due to a superimposed heavy infection with intestinal bilharziasis or to a secondary bacterial infection following on this. Anti-bilharzia measures are being adopted on his recommendation. He points out that sufficient attention is not paid to the mortality due to bilharziasis, and that as the disease is chronic the deaths are not noted by the Medical Officer of Health.

T. W. M. C.

CAWSTON (F. G.). **Some Observations on the Source of Bilharzia Infection and the Combined Treatment of a Case in Natal.**—*Jl. Trop. Med. & Hyg.* 1924. Nov. 1. Vol. 27. No. 21. pp. 283–284. [5 refs.]

After referring to the occurrence of *S. bovis* in *Physopsis africana* in Natal and drawing attention to the fact that the curious spindle-shaped bilharzia egg noticed in a Madras Indian by CHRISTOPHERS and STEPHENS may have been derived from infection acquired during early residence in Natal, the author discusses the probability that *S. bovis* is an occasional parasite of man in Africa. The variations seen in the ova of *S. haematobium* may be associated possibly with varieties of the adult worms. Clinical records tend to show that the sodium salt of antimony tartrate takes a larger dose to effect cure than the potassium salt, while the latter is practically without toxic effects when freshly dissolved in a small quantity of saline and given in doses of ½ gr. to 1½ gr. The combination of emetine and tartar emetic does not appear to increase the toxicity of either drug appreciably.

R. T. L.

CAWSTON (F. G.). **Bilharzia in Natal.** [Correspondence.]—*S. African Med. Rec.* 1924. Nov. 8. Vol. 22. No. 21. p. 510.

Although fresh-water snails are swept down the Natal rivers in large numbers few instances of infection occur from bathing in the lagoons at the mouths of these rivers. The author explains this by the following facts :—(1) Lagoon-crabs feed ravenously on fresh-water snails ; (2) Water weeds that thrive in semi-salt water are not favourable to the life of the normal inhabitants of fresh-water pools ; (3) Few of the snails are infected, because the rains which wash them down occur at the end of the winter months ; (4) The tidal sea-water rapidly kills both the cercariae and fresh-water snails.

H. H. S.

CAWSTON (F. G.). **A Search for Intermediate Hosts and a Study of their Radulae.**—*Jl. Trop. Med. & Hyg.* 1925. Jan. 1. Vol. 28. No. 1. pp. 14–15. With 3 text figs.

Schistosomiasis appears to be diminishing in Natal owing to the more thorough treatment of infected persons and to measures taken to warn school children as to the ways in which the disease is contracted. There is also apparently a seasonal variation in the degree of infestation of fresh-water snails. Specimens of *Burnupia* have been found to harbour *Cercaria constricta*. Owing to the general similarity between various species of Burnupia and some other schistosome carriers the author suggests that for the better identification of the different hosts of Schistosoma a careful study of the radulae should be undertaken, since they differ greatly in various groups. In order to do this the radula should be separated, cleaned, and examined under a one-twelfth magnification.

H. H. S.

BERTRAND. **Contribution à l'étude de la bilharziose au Congo Belge.**—*Bull. Méd. du Katanga.* 1924. Dec. Vol. 1. No. 6. pp. 254–255.

Many of the natives employed in the mines of Upper Katanga are infected with schistosomes. Most of them are carriers of *S. mansoni*, but some have *S. haematobium*. No autochthonous case has yet been found; the patients bring the infection with them from Kabinda and Northern Rhodesia. Cure is rarely obtained with less than a total of 2–2·5 gm. of tartar emetic, and many need 3 gm. Though some patients will tolerate 10 cgm. daily, the author finds 5–6 cgm. better borne and giving equally good results.

H. H. S.

FAUST (Ernest Carroll). **The Reactions of the Miracidia of** *Schistosoma japonicum* **and** *S. haematobium* **in the Presence of their Intermediate Hosts.**—*China Med. Jl.* 1924. Nov. Vol. 38. No. 11. pp. 906–913. With 1 plate. [5 refs.]

Whereas the miracidia of *S. japonicum* rise and maintain themselves within a few millimetres of the surface of water those of *S. haematobium* distribute themselves uniformly throughout the medium. These biological phenomena are related to the habits of the respective intermediate hosts. "Although the host-parasite mechanism is based on a precise adjustment the miracidium is capable of a very wide accommodation as regards temperature and H-ion concentration."

R. T. L.

SHOUSHA (A. T.). **Complement Fixation Reaction in Bilharziasis by the Use of** *Fasciola hepatica* **Extract as an Antigen.**—*Reports and Notes of the Public Health Laboratories, Cairo. No. 6.* 1924. pp. 191–193. [5 refs.]

Experiments made with alcoholic and with ½ per cent. carbolic saline extracts of *Fasciola hepatica*, used as antigen for complement fixation tests, gave positive results in only 71·1 per cent. and 67·6 per cent. respectively of cases known to be infected with bilharzia. Shousha concludes that the large number of negative results limits the diagnostic value of the test.

T. W. M. C.

BLACKLOCK (D. B.). **Report on an Investigation into the Prevalence and Transmission of Human Schistosomiasis in Sierra Leone.**—*Sierra Leone Ann. Med. & San. Rep. for the Year 1923.* Appendix XI. pp. 80–87. With 5 figs.

The author examined the faeces of 134 males and 54 females and concluded that infection by *S. mansoni*, if existing at all in this region, is very rare. Urinary examination, however, of 668 males and 140 females revealed ova of *S. haematobium* in 199 of the former (29·7 per cent.) and 106 of the latter (75·7 per cent.). Among the 668 there were 360 between the ages of 3 and 10 years and 81 cases of infection were found in them, or 22·5 per cent. Improvement rapidly followed intravenous injection of antimony, but the patients could not be persuaded to continue treatment after the disappearance of the

main symptoms. Of snails examined for cercariae a species of Physopsis was the only one found to harbour those of *S. haematobium.* 1,557 specimens were dissected; 306 contained cercariae and 184 those of *S. haematobium.* It is shown that the infection-rate was directly proportional to excretal contamination of the village water-supply, so that a modification of the latrine arrangements should result in a marked diminution of human schistosomiasis. A brief account is given of the bionomics of this Physopsis, showing that it has considerable powers of resistance to drying.

It is suggested that a demonstration campaign should be undertaken in a badly infested village. This should comprise provision of a pure drinking water supply, a method of disposal of excreta away from water, a snail-free bathing and washing place, and the treatment of polluted waters.

H. H. S.

INGRAM (A.). **Note on a Possible Intermediate Host of** *Schistosoma haematobium* **in the Gold Coast.**—*Ann. Trop. Med. & Parasit.* 1924. Oct. 31. Vol. 18. No. 3. pp. 265–266.

The Bullinus-like snails found in collections of water near Accra, Gold Coast, are: *Isidora forskali*, *Physa waterloti* and *Physopsis globosa.* Attempts to infect rats experimentally with the furcocercous cercariae, which occurred naturally in the *P. globosa* to the extent of 1·2 per cent. and in 14 out of 25 survivors of a stock experimentally submitted to infection with miracidia of *S. haematobium*, were all negative, but this species appears to be the probable intermediary on the Gold Coast.

R. T. L.

PATANÉ (Carmelo). **La bilharziosi in Cirenaica. Due nuove osservazioni interesse di una locale inchiesta malacologica conforme alle esigenze delle moderne acquisizioni su l'etiologia delle schistosomiasi umane.**—*Ann. di Med. Nav. e Colon.* 1924. July-Aug. Year 30. Vol. 2. No. 1–2. pp. 1–19. With 1 fig. & 2 plates. [14 refs.]

Very little is known concerning the molluscan fauna of Cyrenaica. In the tableland, over 620 metres above sea-level, bilharziasis is not endemic. In the region of Derna numerous examples of Bullinus were found living in irrigation channels and ponds which originate in the wadis running the whole year across the country. Here, too, *Planorbis atticus* occurs. Nothing definite can be reported regarding the coast region owing to the scanty semi-nomadic population. It is nevertheless remarkable that Cyrenaica enjoys, in spite of its nearness to Egypt, immunity from *S. mansoni.* The author records two cases of *S. haematobium* in young natives of Derna, acquired apparently from bathing in Ras-el-Ain in Derna.

R. T. L.

FELIX (A.). **Observations on Vesical Bilharziasis in Palestine.**—*Amer. Jl. Trop. Med.* 1925. Jan. Vol. 5. No. 1. pp. 41–61. [21 refs.]

Bilharziasis is stated to have been endemic in Palestine for a great length of time and *not* disseminated in the country during the war

by the Egyptian Labour Corps. In the Orphanage at Jaffa 43 per cent. of 53 children between the ages of 9 and 14 were found to be infected with *S. haematobium.* The only possible sources of infection were the river Auja, its tributaries, and the reservoirs supplying the irrigation systems of the orange groves. In the Jewish agricultural School at Mikveh Israel 13 per cent. of 158 boys, between the ages of 14 and 18, were also found infected. These results led to a general examination of school children in the Jaffa area, and 4·3 per cent. out of 1,256 children were shown to be positive and a further 6·7 per cent. were "suspect." The author does not accept the conclusions of BUXTON and KRIKORIAN that the disease is dying out, for he has evidence that well authenticated cases of new infections were acquired in 1922 and that the creation of new agricultural settlements within range of infected streams is likely to result in an extension of the disease. In the course of 2,400 microscopical tests of faeces two cases of *S. mansoni* were noted, but in both there was a possibility that the infection had been acquired outside Palestine. It is recalled that *Planorbis boissyi* has not yet been found in Palestine. The diagnosis of slight vesical cases frequently presents serious difficulties; eosinophilia fails as a positive test. In these cases the complement fixation-test as applied by FAIRLEY acquires particular significance. Subcutaneous injection of emetine never resulted in permanent cure, while tartar emetic intravenously injected never failed.

R. T. L.

DIMITRACOFF (C.). **Un cas de bilharziose vésicale Européenne.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1925. Jan. 1. Year 40. 3rd Ser. Vol. 48. No. 39. pp. 1771–1774. With 1 text fig.

A case of vesical bilharziasis was seen at the Therapeutic Clinic in Sofia, Bulgaria. The patient originally came from the village of Houbavéné, Bulgaria, but served in Macedonia and in France during the war. A photograph in the text shows that the eggs passed in the urine were typical *S. haematobium* ova.

R. T. L.

HOLLAND (E. P.) & WOODWARD (E. A.). **A Case of Bilharziasis Endemic in Australia.**—*Med. Jl. Australia.* 1924. Dec. 6. 11th Year. Vol. 2. No. 23. p. 606.

A brief note is made of the occurrence of bloody urine containing eggs of *S. haematobium* in a boy, aged 3 years, who was born and had always lived in the same house in Grafton, New South Wales. Since the age of 18 months the boy had frequent bleedings from the rectum. The authors state that a number of eggs were "twice to three times as large as the typical ones, spherical, the clear capsule much thicker, the spine missing, and the ovum seemed to show signs of commencing degeneration. One cell bore a lateral spine." [No hint is given of the possible source of the infection.]

R. T. L.

PIRIE (J. H. Harvey). **Bilharzial Appendicitis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1924. Oct. 23. Vol. 18. No. 4. pp. 210–213. [7 refs.]

The author shows that conditions of appendicitis, more particularly chronic appendicitis, associated with and probably due to schistosome infection are not so rare as has been supposed. Thus during the five

years 1919–1923, twenty appendices have been sent to him which on examination proved to be more or less heavily infested with ova of *S. haematobium.* These ova were most abundant beneath the serous surface and agglomerations of them produced small white nodules, not uncommonly mistaken for tubercles, though the latter are less hard, glistening and porcelain-like than *schistosoma* "tubercles." Giant cells are seen in both.

H. H. S.

SPEDENER. **Note sur le traitement de la bilharziose par l'émétique.**—*Bull. Méd. du Katanga.* 1924. Dec. Vol. 1. No. 6. p. 256.

The author formerly was accustomed to treat schistosome infection by 30 injections of tartar emetic, giving 1 gr. daily, but the occurrence of two deaths and of untoward symptoms in others led him to conclude that this method was too energetic. He now gives a course of five injections of the antimony, then a dose of 606 and waits for eight days before renewing the former drug. The total amount of 30 gr. is maintained. The results are quite satisfactory.

H. H. S.

SHARP (C. G. Kay). **Treatment of Schistosomiasis. A Review.**—*Med. Jl. S. Africa.* 1924. Sept. Vol. 20. No. 2. pp. 30–34. [32 refs.]

A critical review of the methods of treatment of schistosomiasis during the last nine years. The greater part is naturally devoted to the use of tartar emetic; the history of its employment, the untoward symptoms which may arise, and the dosage recommended are dealt with in the chronological order of the published papers on the subject. The use of emetine and the work of CAWSTON are described separately, because this work was concerned with South Africa in particular. The subject is clearly summed up by the author in the following words:—

"I have examined the urines of a large number of children in the schools in Natal, who have undergone a course of emetine treatment . . . and I have found that many of these cases pass viable ova in the urine although all the symptoms of bilharzia disease, so far as the patient can observe, have been absent since the cessation of treatment, the period varying from a few months to two years. The foregoing review of the treatment can leave no doubt as to the efficacy in the large majority of cases of the intravenous injection of tartar emetic in adults and emetine in children, but from my experience of the cases of children who have received a course of emetine treatment, and in whose urine I have so often found viable ova, although there has been no risk, so far as I could ascertain, of reinfestation, the pronouncement of a cure should be made with some diffidence until a sufficient time, say six months, has elapsed since the cessation of treatment, and repeated examinations of the early morning urine have been carefully made."

H. H. S.

HARKNESS (A. H.). **Intravenous Antimony Treatment of Bilharziasis and other Infections.**—*Jl. Clin. Res.* 1923. Apr. Vol. 9. No. 2. pp. 55–58.

Brief accounts are given of two cases of urinary schistosomiasis. The first patient, who had become infected 17 years previously in South Africa, had been treated with urinary antiseptics, vesical irrigations and emetine

in full doses without lasting effect. Sodium antimony tartrate was then administered intravenously, and after 10 gr. had been given there was great improvement, but injections were continued to a total of 25 gr. At the time of writing, two years later, there was neither blood, albumin, nor ova present in the urine. The second case is instructive in that the condition was diagnosed as gonorrhoea owing to a urethral discharge and frequency of micturition following exposure to venereal infection; similar symptoms had occurred two years earlier when the patient was in India. This case, too, proved to be bilharzial and cleared up with intravenous administration of antimony. An interesting point is the fact of the infection having been contracted probably in India.

H. H. S.

CAWSTON (F. G.). **Antimony Tartrate in Bilharzia.** [Correspondence.] —*Lancet.* 1924. Oct. 18. pp. 831–832.

The author recommends the employment of the potassium salt of antimony in preference to the sodium salt on the grounds that, when dissolved in boiling saline, it has no toxic effect and that a smaller total amount is required. This last is of particular importance when there is considerable destruction of liver tissue, as, for example, in infection by *Schistosoma japonicum.*

H. H. S.

ITURBE (Juan). **Some Data concerning the Life Cycle of the** *Schistosoma mansoni.* **Distribution and Prophylaxis of Schistosomiasis in Caracas.**—*Proc. Internat. Conference on Health Problems in Trop. America.* 1924. pp. 428–437. [11 refs.] [United Fruit Company, Boston, Mass.]

——. **Data concerning the Cycle of** *Schistosoma mansoni.*—*Southern Med. Jl.* 1925. Jan. Vol. 18. No. 1. pp. 34–38.

The commonest molluscs in the Caracas Valley are *Ampullaria luteosoma, Physa rivalis, Planorbis cultratus* and *P. guadelupensis.* The last mentioned species is the intermediate host of *Schistosoma mansoni* in Venezuela. Up to 1916 *S. mansoni* was observed in Caracas to an alarming extent. The mollusc lives and thrives in pools constantly forming in the bed of the river Guaire in the very thin subterraneous stratum contiguous to the alluvial soils of the river; the sluggish irrigation canals also serve as its home. The majority of the inhabitants take water for domestic purposes from these two sources, and 150 out of 1,000 specimens of mollusc collected proved to be naturally infected. Since RISQUEZ published in 1916 statistics from the Hospital Vargas showing an infection rate of 28 per cent. there has been a marked decrease. At present the infection occurs in only 5 per cent. of the patients. The author's personal statistics show 5 cases out of 600 persons whose faeces were microscopically examined. This change is attributed to propaganda and preventive and curative measures, the latter comprising prohibition of cultivation of the lands bordering the river Guaire or of its further irrigation and the systematic use of tartar emetic.

R. T. L.

FAUST (Ernest Carroll) & MELENEY (Henry Edmund). **Studies on Schistosomiasis japonica. With a Supplement on the Molluscan Hosts of the Human Blood Fluke in China and Japan, and Species Liable to be confused with them,** by Nelson ANNANDALE.—*Amer. Jl. Hyg.* Monographic Series. 1924. Mar. No. 3. 339 pp. With 36 plates & 25 text figs.

——. **Schistosomiasis in China: Biological and Practical Aspects.**—*Lancet.* 1924. Jan. 5. pp. 21–24. [23 refs.] & *Proc. Roy. Soc. Med.* (Section Trop. Dis. & Parasit.). 1924. Mar. Vol. 17. No. 5. pp. 31–42. With 1 plan. [23 refs.]

The "Studies on Schistosomiasis japonica" forms a beautifully illustrated and printed addition to the Monograph Series of the *American Journal of Hygiene.* It covers 340 pages and is illustrated by 36 plates, 25 text figures and numerous diagrams. After a brief introduction and an historical sketch the bulk of the work falls under seven main divisions dealing respectively with (*a*) morphology, biology and life history of *S. japonicum*; (*b*) the route of migration of the young parasite in the body; (*c*) the intermediate hosts; (*d*) the distribution of schistosomiasis in the Orient; (*e*) pathological anatomy; (*f*) clinical aspects in man and animals; (*g*) prophylaxis. There are also appendices comprising an essay on the classification of the Chinese carriers by Dr. Annandale and a detailed bibliography.

The egg of *S. japonicum* as found in the faeces is an oval object with an average length of 89μ and a breadth of 66μ. The wide differences recorded by various observers are due to degree of maturity of the egg measured. The phenomena of hatching depend on the maturity of the miracidium and increased internal tension associated with hypotonicity and absence of fermentative agents in the medium. The miracidium escapes through a longitudinal split in the shell usually opposite the spine. It survives as a free-swimming body for a period of from 60 to 72 hours. Infection of the intermediate host occurs in the surface layer of the water indicating a delicate adjustment to the habits of the snail. The course of development within the snail has been traced for a period of 47 days. The miracidium enters by penetrating to the blood stream through the gill filaments or by piercing the tissues of the head or foot and attaining the lymph sinuses. About the seventh day the miracidium loses its characteristics and after three weeks becomes an elongated spinose sac containing the morula stage of secondary sporocysts. The worms have gradually passed from the lymph spaces surrounding the salivary glands to the region of the nephridia and continue to pass still further distad. At the commencement of the fifth week the larvae have become differentiated into primary sporocysts about 400μ in length and contain elongating secondary sporocysts. A week later the worms have reached the lymph spaces between the liver and gonads and the mother sporocyst has ruptured, releasing the daughter sporocysts which contain the germ balls of the cercariae. At the end of seven weeks these secondary sporocysts measure 250μ by 40μ and contain differentiated cercariae. The final differentiation also take place in the lymph spaces, for the larval worms never break into the liver or gonidial tissue except by accident. The cercariae vary in measurements due to maturity, contractibility, differences in nutrition and intrinsic size variation. The excretory system is of generic, *not* specific value. There are five pairs of cells in the cephalic glands; as they mature

they change from basophilic to oxyphilic. The genital *anlage* is undifferentiated in the cercariae. After infection of the definitive host sex differentiation is recognizable on the sixth day; mating occurs on the 17th day although sexual maturity is not reached until the 30th day. In the mature male the number of testes is consistently seven.

The chapter dealing with the route of migration is devoted to an account of experiments which confirm MIYAGAWA's contention that the main course taken by the young forms of *S. japonicum* from the lungs to the liver is by way of the pulmonary veins, the arterial circulation, the gastro-intestinal capillaries and the mesenteric and portal veins. The possibility that larvae from the lung in advanced state of development could penetrate the stomach mucosa was eliminated experimentally.

Chapter IV deals with the discovery of the molluscan hosts of *S. japonicum.* In the neighbourhood of Soochow and afterwards in other regions this proved to be *Oncomelania hupensis*, a form very similar in appearance and habitat to *Katayama nosophora*, which species was found to occur in the Shaohsing area and was afterwards collected also in the Pearl River delta in South China.

Chapter V gives detailed information regarding the limits of the endemic areas for schistosomiasis in Central and South China. While the Yangtze Valley is the major centre of infection, it is stated that "the main course of the stream is not known to be responsible for a single case of infection." Reservoir hosts in China appear to be dogs, although native dogs are only slightly infected, cats and imported cattle. Native oxen are reported to be immune. Horses are not used in the endemic regions and donkeys are rare. It is considered that in China man alone is the important definitive host.

Chapter VI deals with pathological anatomy. The invading cercaria produces a local reaction characterized histologically by oedema, congestion and leucocytic infiltration in the skin. In its passage through the lung and later the alimentary tract the chief lesions produced by the young worm are haemorrhages. In massive infections of the liver there is necrosis of the parenchyma and a degeneration of the convoluted tubules of the kidneys due apparently to toxins. Polymorphonuclear leucocytes, chiefly eosinophiles, congregate around the eggs in the tissues and abscesses form. These breaking outwards by small openings into the mucosa result in the cavities becoming lined by the proliferating epithelium. This is, in the authors' opinion, an important factor in the development of intestinal papillomata. Thrombosis of the larger mesenteric and portal veins is frequently seen in late cases. In the liver there is in addition to the lesions produced by the local deposition of eggs a general pipe-stem cirrhosis of the large and small branches of the portal veins. The spleen varies greatly. It may be hugely hypertrophied. Eggs may be found in the pancreas and spleen. Lung lesions are insignificant. In rare cases eggs may cause Jacksonian epilepsy, but how they reach the brain is difficult to determine.

In chapter VII the clinical manifestations are described under three headings: those associated with skin infection, the stage of acute local symptoms due to egg-deposition and extension and the stage of cirrhosis of the liver due to tissue proliferation and repair. It is noted that the blood-serum globulin is twice as high as usual, and the "globulin precipitation test" and "aldehyde test" regarded previously

as specific for kala azar were found to be strongly positive in many cases. Antimony tartrate in a total dosage of 1·5 to 2 gm. in 18 to 20 days proved curative.

In a final chapter the question of prophylaxis is discussed. In China the problem is extremely complex. It is not merely one of public health but involves economic and political questions. At the present time it seems unwise to recommend in China the extirpation of the intermediate host owing to the extent of its distribution. The authors recommend :—

(*a*) Control of faeces disposal.
(*b*) Avoidance of exposure to infection.
(*c*) Specific treatment by out-patient clinics.
(*d*) Educational propaganda.

In an Appendix by the late Dr. N. Annandale the molluscan hosts in China and Japan and species liable to be confused with them are dealt with. Dr. Annandale regarded *Hemibiae* and *Katayamae* as mere sections of Oncomelania, distinguished by the fact that the shells of the species included in the former have vertical ribs, while those in the latter have not. He recognized five living species of Oncomelania : (1) Shell smooth, *O. formosana*, *O. nosophora* ; (2) Shell with vertical ribs, *O. sublaevis*, *O. longiscata* and *O. hupensis*. Of these *O. sublaevis* and *O. longiscata* are doubtful species, so that all the accepted species of *Oncomelania* are now known to be carriers of *S. japonicum*.

R. T. L.

TAI (J. T.). **A Preliminary Report of Cases of** *Schistosoma japonicum* **Infection.**—*Nat. Med. Jl. China.* 1924. Dec. Vol. 10. No. 6. pp. 370–376.

The subject of infection by *Schistosoma japonicum* in Yangchow and its neighbourhood is briefly presented in this preliminary paper. Exposure occurs in working barefoot in irrigated rice-fields, fertilized mainly by human excreta. Of 400 persons whose faeces were examined 28, or 7 per cent., were found positive. Patients came from all the surrounding areas except the north-west, where the ground is more elevated and irrigation and chance of infection less. Many cases were of two years' duration or more, and in them treatment by intravenous antimony did not bring about much benefit [though it must be stated that the duration of treatment was very brief, a fortnight or less in most instances]. Patients coming early under treatment, before there was much in the way of symptoms or constitutional disturbance, improved more rapidly. Two of them, after four and seven injections respectively (the injections being given three times a week), "showed no schistosome eggs in the faeces on three successive examinations at intervals of several days."

H. H. S.

MELENEY (Henry Edmund). **Schistosomiasis japonica in the United States Navy.**—*U.S. Nav. Med. Bull.* 1924. Nov. Vol. 21. No. 5. pp. 630–636. [9 refs.]

A case of schistosomiasis is reported in a member of the United States Navy who went hunting in the Yangtze Valley on 16th, 23rd and 24th May, 1923. He wore shoes, socks, canvas puttees and woollen trousers and waded about in ponds and canals. No itching, fever or

urticaria was experienced, but 26 days after the last date he began to feel feverish at night and had severe pains in the back and calf muscles. On 22nd June no eggs could be found in the faeces by the brine flotation method, but the blood showed 17 per cent. eosinophilia, which increased to 23 per cent. two days later. On 14th July the eosinophilia stood at 38·7 per cent., and the blood serum globulin precipitation test was (2 plus) positive. Eggs of *S. japonicum* were found in fresh smears of faeces.

Treatment with sodium antimony tartrate was started on (circa) the 54th day after infection. After the seventh dose (a total of 0·95 gm. of the drug) no more eggs were found. The last treatment was given on the 17th day. Nine days later the eosinophile cells were 29 per cent., but the patient had gained 5 lbs. in weight and was in excellent general condition. On 19th June, 1924, the eosinophiles were 1 per cent., the blood globulin test negative, and the faeces contained no ova.

As the eggs are permeable the brine flotation method is inapplicable, as it causes marked shrinking. The most accurate method is to wash the faeces and hatch out the miracidia. The use and value of the blood serum globulin precipitation test during treatment is emphasized.

R. T. L.

CULLEN (J. P.). **Human Schistosomiasis in India.**—*Jl. Trop. Med. & Hyg.* 1924. Dec. 15. Vol. 27. No. 24. pp. 337–338.

The author recorded in July, 1924, the first case of infection by *S. japonicum* in Burma. He now records 8 others, 6 of them natives of Yunnan. One was treated by tartar emetic, and after a total of 12 grs. had been given ova disappeared from the faeces. The other patients were considered to be too far advanced for specific treatment.

Attention is drawn to the fact that Asiatic schistosomiasis is more widely spread than the text-books would lead us to suppose, and the author advises accurate determination of the distribution of the disease with a view to preventive measures.

H. H. S.

NISHI (Michitomo). **Experimental Study on the Treatment of Schistosomiasis Japonica with Tartar Emetic. Clinical Observation, Histological Investigation and Pathological Changes on Animal Intoxicated with Tartar Emetic.**—*Scientific Reports from Govt. Inst. for Infectious Diseases.* Tokyo. 1923. Vol. 2. pp. 485–501. With 1 plate. [61 refs.] and *Japan Jl. Experim. Med.* 1923. June. Vol. 7. No. 7.

The effect of tartar emetic on the adult worms and eggs of *Schistosoma japonicum* in the host's tissues has been studied experimentally in dogs, the sodium salt of tartar emetic being used, as it contains the same amount of antimony as the potassium salt yet is less toxic.

Injections given shortly after dogs had been experimentally infected with cercaria showed that the drug is able to kill the young schistosomes and, consequently, prevent an attack of schistosomiasis. The therapeutic dose of the sodium salt for dogs proved to be 0·001–0·005 gm. per kilogram of bodyweight, thus conforming with the dose of the potassium salt as determined for man. With doses of 0·005 gm. per kilo a few atrophied worms only were found in the portal vein. Degeneration and necrosis were seen in every kind of parenchymatous

cell, viz., nerve, flame and other matrix cells of the adults. In the ovary vacuolation occurred. The yolk glands were also affected, likewise the testes. The body colour differs from the normal markedly and tends to be grey or whitish owing to lack of pigment in the intestine. The changes in the eggs in the tissues are also described.

R. T. L.

TANAKA (Shyuji). [**On the Thermal Resistance of the Cercaria of** *Schistosomum japonicum* **and also on the Infection by Bathing in Warm Water.**]—*Tokyo Ijishinshi* (*Tokyo Med. News*). 1924. Nov. No. 2393. [Summarized in *Japan Med. World.* 1925. Feb. 15. Vol. 5. No. 2. p. 41.]

The usual temperature of the bath water used by the Japanese is 43°-47° C., the optimum being 45°-46° C. In such warm water the cercaria of *S. japonicum* would be unable to infect the human body. If, therefore, bath water is cooled by well-water, not by river-water, or if the heating of river-water should have been continued for more than five minutes before the person uses the bath no danger of infection would be incurred.

R. T. L.

LUDLOW (A. I.). **Inguinal Hernia: Ova of** *Schistosoma japonicum* **in Hernial Sac.**—*China Med. Jl.* 1924. Oct. Vol. 38. No. 10. pp. 829–832. [9 refs.]

A Korean male, 70 years of age, was operated upon for double inguinal hernia extending into the scrotum. About a week later the left side of the scrotum began to swell, and on two occasions bloody fluid was evacuated from it, after which healing took place. Section of tissue from the sac showed that it was of a granulomatous nature with a thick fibrous capsule. The tissue contained ova of *S. japonicum* in large numbers. This is said to be the first case of *S. japonicum* infection recorded in a Korean and the first in which the condition was connected with a hernial sac.

H. H. S.

i. CHRISTOPHERSON (J. B.). **Le traitement prophylactique de la bilharziose. Communication faite au Congrès britannique d'hygiène tenu à Bordeaux le 5 juin 1924.**—*Rev. Méd. et Hyg. Trop.* 1924. Aug.-Dec. Vol. 16. No. 6. pp. 173–177.

ii. CAWSTON (F. G.). **"Bilharzia," a Paper for the Practitioner.**—*Jl. Trop. Med. & Hyg.* 1924. Dec. 1. Vol. 27. No. 23. pp. 322–326.

iii. LOTSY (G. O.). [**Bilharziosis und Calculosis.**]—*Fortschr. a. d. Geb. d. Röntgenstrahlen.* 1924. Vol. 32. pp. 546–554. [Summarized in *Med. Sci. Abstr. & Rev.* 1925. Mar. Vol. 11. No. 6. p. 484.]

iv. SHARP (C. G. Kay). **Schistosomiasis in Natal.**—*S. African Med. Rec.* 1924. Oct. 25. Vol. 22. No. 20. pp. 471–474.

v. PUGH (Winfield Scott). *Schistosoma Haematobium* **Infection and its Relation to Persistent Urinary Sinus.**—*Boston Med. & Surg. Jl.* 1924. Nov. 6. Vol. 191. No. 19. pp. 873–875. [30 refs.]

vi. TSYKALAS. **Notes sur la bilharziose intestinale.**—*Rev. Méd. et Hyg. Trop.* 1925. Jan.-Feb. Vol. 17. No. 1. pp. 15–22.

i. The author reiterates his well-known views on the relative merits of treatment of schistosome patients and carriers and the destruction of schistosome invertebrate intermediaries in the eradication of the Bilharzia disease.

ii. A short elementary account of bilharzia infection and its etiology, diagnosis and treatment based upon South African experience and addressed to the practitioner in South Africa. In thick boards it is issued as a separate publication.

R. T. L.

iii. By the use of soft radiation and a small diaphragm radiological diagnosis of schistosome infection can be carried out in the stages of ulceration and fibrosis, and of scarring, stricture and obliteration. It is less satisfactory in the stage of infiltration with ova in which there are merely sessile infiltrations and papillomata.

iv. The prevalence of urinary schistosomiasis in Natal varies from less than 3 to about 10 per cent. in school-children. In Durban among a male school population of 5,000 the incidence, based on recorded cases, is 2·4 per cent.

v. Two cases of infection with *Schistosoma haematobium*, one with a urethral, the other with a renal sinus, were treated with tartar emetic intravenously and recovered. The rest of the paper contains nothing fresh, except mistakes, which are numerous.

vi. The author reports, as if it were new, that lateral-spined ova may be found in the urine and terminal-spined ova in the faeces. For treatment of schistosomiasis he favours emetine in large doses of 0·1-0·17 gm., and a total of 1-1·2 gm. intravenously in six days. The risk of toxic effects, he finds, are less when large doses are given.

H. H. S.

OHI (Tsukada). [**On the Infection by** *Fasciolopsis buski* (**Lankester**) **among the Japanese. On the Infection's Route with the Human Body and the Pig.**]—*Tokyo Ijishinshi* (*Tokyo Med. News*). 1924. Nov. No. 2396. [Summarized in *Japan Med. World.* 1925. Feb. 15. Vol. 5. No. 2. p. 41.]

The author reports two cases of infantile infection by *Fasciolopsis buski* among the Japanese. The infection came perhaps from eating the raw seed of water plants which the inhabitants of Southern Formosa are accustomed to do. [This is apparently the first record of this parasite acquired by man in Formosa—see SUZUKI *infra*. Hitherto the pig has been considered the sole definitive host there, and some have questioned the identity of the porcine species with that in man.]

R. T. L.

SUZUKI (Sotowo). [**On the Human Infection by** *Fasciolopsis buski* **in Formosa.**]—*Tokyo Ijishinshi* (*Tokyo Med. News*). 1924. Dec. No. 2399. [Summarized in *Japan Med. World.* 1925. Feb. 15. Vol. 5. No. 2. p. 42.]

——. **Human Cases of** *Fasciolopsis buski* **found in Formosan Natives.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1925. Jan. No. 238. English summary pp. 6–7. [In Japanese.]

Among 228 school children in a town in the southern part of Formosa the author found 1·75 per cent. infected with *Fasciolopsis buski*.

R. T. L.

HARA (Chikawo). [**Report on Pulmonary Distomiasis in Keishyo-Nando Prefecture, Korea.**]—*Chosen Igakkwai Zasshi* (*Jl. of Korean Med. Soc.*). 1924. Sept. No. 49. [Summarized in *Japan Med. World.* 1925. Feb. 15. Vol. 5. No. 2. pp. 44–45.]

In the province of Keishyo-Nando the author examined for paragonimiasis 11,139 out of the total population of 26,157. 118 carriers of Paragonimus were found, "the maximum percentage . . . in the villages being 12·87 per cent., the minimum 9·23 per cent. and the average 1·42 per cent."

R. T. L.

KONDO (Kiichi). [**Antimony Treatment of Paragonimiasis.**]—*Tokyo Ijishinshi* (*Tokyo Med. News*). 1924. Aug. & Sept. Nos. 2383, 2384 & 2385. [Summarized in *Japan Med. World.* 1924. Dec. 15. Vol. 4. No. 12. pp. 326–327.]

Stibnal given to 19 cases of paragonimiasis in repeated injections totalling 0·9-1·8 gr. resulted in a quantitative decrease and disappearance of bloody expectoration. The colour of the sputum improved. The eggs decreased numerically and eventually ceased to appear. *In vitro* experiments showed that all the eggs lost vitality after 7 days in a 1 in 10,000 solution of stibnal and replaced in clean water for 14 days. In 3 of the cases treated there were symptoms: slight dizziness, acceleration of cardiac frequency, nausea, etc., but these lasted only for a short time.

R. T. L.

CHIN EM PO. **On a Case of Irreducible Inguinal Hernia containing a Portion of the Great Omentum with a Cyst and Tubercles both caused by** *Paragonimus westermanii* **and its Eggs.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. of Formosa*). 1924. May. No. 234. English Summary p. 9. [In Japanese.]

During operation on an irreducible inguinal hernia which contained a portion of the great omentum, numerous tubercles were seen on this together with a cyst of the size of a small hen's egg. These proved on closer inspection to have been caused by *Paragonimus westermanii* and its eggs. The patient was a Chinese who had complained of cough, with a dark brown sputum, since last year.

R. T. L.

HAGA (J.). **Een geval van infectie met** *Opisthorchis felineus* **bij den mensch.** [A Case of Infection with *Opisthorchis felineus* in Man.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1924. Vol. 64. No. 5. pp. 835–837. [2 refs.]

On one occasion during the course of an attack of amoebic dysentery in a native soldier a specimen of the stools contained two typical ova of *Opisthorchis felineus.* None has been found since.

W. J. Bais.

SHATTUCK (George Cheever). **Treatment of Clonorchiasis. Further Observations.**—*Amer. Jl. Trop. Med.* 1924. Nov. Vol. 4. No. 6. pp. 507–517. [1 ref.]

This is an interesting paper giving the results of treatment of six cases of clonorchiasis by tartar emetic and arsphenamin; three of them have been previously recorded; the other three are detailed in an appendix. Apparent cure was brought about in four of the six, judging by disappearance of ova for two consecutive months; prior to treatment these had been found with great regularity. Two cases cleared up on administration of tartar emetic alone, but, strangely enough, more rapidly in a patient who proved none too tolerant of the drug. In a third patient tartar emetic was ineffectual, but a few small doses of arsphenamin subsequently led to the disappearance of ova. It is possible, of course, that the former drug had prepared the way for the second. In another, however, the reverse of this occurred. An intensive course of intramuscular injections of sulph-arsphenamin proving unsuccessful, a few doses of tartar emetic were administered intravenously, and a cure resulted. In view of these occurrences the

author suggests that it might be well to administer an antimonial and an arsenical preparation alternately or in alternating intensive courses.

H. H. S.

KATATA (Buyo). **[On the Action of Stibnal against Experimental Liver Distomiasis.]**—*Aichi Igakkwai Zasshi (Jl. of Aichi Med. Soc.).* 1924. Sept. Vol. 31. No. 5. [Summarized in *Japan Med. World.* 1925. Feb. 15. Vol. 5. No. 2. p. 45.]

Experimentally stibnal has been found to have a vermicidal action on *Clonorchis sinensis.* After its administration the worms were found to undergo atrophy and to lose their power of laying eggs.

R. T. L.

LE BAS (G. Z. L.). **Experimental Studies on** *Dibothriocephalus latus* **in Man.**—*Jl. Helminthology.* 1924. Sept.-Nov. Vol. 2. Nos. 4 & 5. pp. 151–166. With 7 charts in text. [7 refs.]

A most interesting paper of detailed experimental studies with *Dibothriocephalus latus* which tends to show fairly conclusively that the serious and even fatal effects of infection as recorded in text-book after text-book are due to some other factor than the presence of the parasite. The effects in three volunteers previously in good health were little more than discomforting.

Two of the three subjects swallowed four living plerocercoids each, the third a single one only. The symptoms experienced were as follows :—

A. Slight cough on the second and third days ; ravenous appetite on the ninth. A week later some irregularity of bowel action till the 21st day, when ova were found in the stools, and a troublesome diarrhoea set in which continued for 4 days. 108 days after infection three live tapeworms were passed as a result of treatment with *Filix mas.* The only after-effects were slight headache and troublesome constipation, perhaps due to removal of the previous irritation. Just prior to treatment the faeces were estimated to contain some 7,000,000 ova per gramme (dried).

B. Similar slight cough in the first three or four days, and partial loss of appetite throughout the experiment. On the 8th day colic, diarrhoea and vertigo with slight rise of temperature (99°-100° F.). Ova were found in the stools on the 15th day and diarrhoea set in two days later. Symptoms after the 24th day were negligible, until the middle of the 14th week, when feelings of faintness, giddiness, palpitation and lassitude were experienced and treatment with Male-fern resulted in the expulsion of three live worms, of an average length of 22 ft. Headache and constipation persisted for three weeks afterwards. Ninety days after infection 12,250,000 ova per gramme of dried faeces were being passed.

C. Anorexia and nausea were experienced 12 days after swallowing the plerocercoid ; on the 25th there was diarrhoea, and two days later ova were found in the stools. Subsequently, until expulsion of the worm, there were vague dyspeptic symptoms with nausea and alternating periods of diarrhoea and constipation. Treatment with carbon tetrachloride led to the evacuation of a dead worm, 11 ft. in length, but twice previously sections of the worm had been passed, 28 in. on the 40th day and 103 in. on the 82nd day. No untoward symptoms succeeded treatment in this instance, and those in the other two may have been due to the *Filix mas.* This patient was passing 12,500,000 eggs per gramme of dried faeces at the end of the fourteenth week of infection.

The symptoms in all, it is seen, were associated with the attainment of maturity of the worm. In view of the previous records the blood changes are important. In each there was a slight leucocytosis with polymorphonuclear increase in the early stages of infection, but no diminution in the number of erythrocytes [though a slight increase in the size of individual red cells was noted by Dr. PASSEY and Mr. Carter BRAINE, see below]. Eosinophilia was present, but not very high, never above 16·6 per cent.

Numerous experiments for determining intradermal, precipitin and complement fixation reactions were undertaken with various extracts, saline, alcoholic, and acetone, with different parts of the segments, but without result. No evidence could be obtained of antibody production in the sera.

H. H. S.

PASSEY (R. D.) & BRAINE (J. Carter). **The Size of the Red Cells in Dibothriocephalus Infection.**—*Jl. Helminthology.* 1924. Sept.-Nov. Vol. 2. Nos. 4 & 5. pp. 167–172. With 4 charts. [3 refs.]

The authors plotted a series of Price Jones' curves to show the distribution of the erythrocytes by size from Miss LE BAS' three cases of experimental and one of natural infection by *Dibothriocephalus latus.* The films were made about the same time each day in order to eliminate diurnal variations.

The patient with natural infection was suffering also from an attack of enteric fever and his blood showed the greater changes, the average diameter of his corpuscles being 8·04μ early in the fever and 7·66μ five weeks later. In the cases of experimental infection the diameter ranged from 6·96-7·03μ at the beginning of the experiment to 7·17-7·68μ at the end. Nine months afterwards one had returned to normal (7μ) ; in the others, after 15 months, the average diameter was 7·18μ. The degree of anaemia in each case was slight. Though the change was but small, it is regarded as tending to be such as is found to occur in pernicious anaemia.

H. H. S.

SALTZMANN (Fredrik). **Die Bedeutung der Wurmauflösung in der Ätiologie der Bothriocephalus Anamie.** [Significance of Disintegration of the Worm in Dibothriocephalus Anaemia.]—*Acta Med. Scandinavica.* Kristiania. 1924. Supplement VII. pp. 268–272. [1 ref.]

Three hypotheses have been advanced regarding the toxin of *Dibothriocephalus latus*: (1) That it resides in the body of the parasite and is liberated only when the worm is destroyed ; (2) That it is free in the intestine of the patient, but is absorbed only when for some reason or other the permeability of the mucosa is increased ; (3) That it is formed and absorbed in every case, but the toxic effects depend on some reacting or non-reacting factor in the patient. The author supports the first of these on the grounds that treatment often gets rid of part of a worm, and while the patient is improving and when general health has recovered more and larger fragments are often

passed without further treatment. If, however, the worm dies and breaks up without being expelled, poison is absorbed, and is probably the cause of the pernicious anaemia.

H. H. S.

ANDO (Akira) & ASAI (Saburo). [**On the Adult Forms of the** *Bothriocephalus latus* **found Parasitic in the Domestic Dogs and Cats in Ohgaki City and Vicinity of Gifu Prefecture, and also on some Parasites.**]—*Aichi Igakkwai Zasshi* (*Jl. of Aichi Med. Soc.*). 1924. Sept. Vol. 31. No. 5. [Summarized in *Japan Med. World.* 1925. Feb. 15. Vol. 5. No. 2. p. 45.]

In the city and suburbs of Ohgaki 100 dogs and 82 cats were examined. The following helminth species were found: *Dibothriocephalus decipiens* [=? *D. mansoni*], *D. latus, Taenia crassicollis, Clonorchis sinensis, Metagonimus yokagawaii, Ascaris canis* and *A. lumbricoides, Trichocephalus depressiusculus, Ancylostoma caninum,* etc. In 3 per cent. of the dogs eggs of the *Ascaris lumbricoides* were found while in 46·3 per cent. of the cats eggs of *D. decipiens* were demonstrated.

R. T. L.

EGUCHI (Suyewo) & TAKAGI (Sampei). [**On** *Diplogonoporus Grandis* **(R. Blanchard, 1894) Luehe 1899.**]—*Aichi Igakkwai Zasshi* (*Jl. Aichi Med. Soc.*). 1924. May. Vol. 31. No. 3. [Summarized in *Japan Med. World.* 1924. Oct. 15. Vol. 4. No. 10. p. 266.]

The English summary merely states that the authors describe minutely the morphology of the worms obtained from the sixth recorded case. There were apparently two complete worms 5·78 and 1·43 metres in length which had been collected by Dr. Takagi in the Shizuoka Prefecture.

R. T. L.

TASHIRO (Kikuwo). **Clinical, Pathologic-Anatomical and Experimental Studies on "** *Plerocercoides Prolifer* **Iijima (1905),** *Sparganum Proliferum,* **Stiles (1906)."**—*Mitt. a. d. Med. Fak. d. Kais. Kyushu-Univ.* Fukuoka, Japan. 1924. Vol. 9. No. 1. pp. 1–42. With 4 plates. [10 refs.]

Since *Plerocercoides prolifer* was first recorded by IJIMA in 1905, four further cases have been described. The present paper deals with the sixth case (excluding that of LE SUEUR, see this *Bulletin,* Vol. 21, p. 949), and all, save that of GATES in America, occurred in Japan. This larval cestode has the capacity of penetrating and traversing the host tissues, except the bones, and in the skin produces characteristic verrucous nodules and thickenings like those seen in elephantiasis. It invades also the viscera and finally causes the death of the victim. The case detailed in this report is that of a young girl in whom the first symptoms appeared in 1915 when 18 years of age, and who died in 1922. The skin of the abdomen and legs often showed indurations and abscesses. When the skin was incised living worms were usually found in pus. Moreover, the verrucous lineal nodules and elevations on the breasts, arms and upper abdomen occasionally changed position due to movement of the larval cestodes. Living worms could always be obtained for study and experiment by tearing off the tips of the nodules or elevations. Feeding experiments to ascertain the definitive host were negative, but the larvae could be transplanted. The paper includes some interesting observations on the histology of the larval worms.

R. T. L.

SCOTT (H. H.). **Stages in the Direct Development of** *Hymenolepis longior* **Baylis.**—*Jl. Helminthology.* 1924. Sept.-Nov. Vol. 2. Nos. 4 & 5. pp. 173–174. With 1 plate.

In continuation of his previous investigations on the direct development of *Hymenolepis longior* Baylis (= *H. nana*), the author fed to mice small portions of intestine of other mice, with villi containing fourth and fifth day cysticercoids in large numbers, and failed to produce infection, thus disposing of the view that the infection of the definitive host is due to the swallowing of cysticercoids passed in faeces. The plate illustrates the development of cysticercoids in the villi from the fifth to the seventh day.

R. T. L.

WOODLAND (W. N. F.). **On the Development of the Human** *Hymenolepis nana* **(Siebold 1852) in the White Mouse; with Remarks on** "*H. fraterna*," "*H. longior*," **and** *H. diminuta*.—*Parasitology.* 1924. Dec. Vol. 16. No. 4. pp. 424–435. [13 refs.]

The author, in continuation of his previous work on the genus *Hymenolepis*, went to Lisbon, where many of the children are found to harbour *H. nana*. He took with him young mice free from infection with *H. fraterna*, and fed 30 of them with fresh *H. nana* eggs obtained from infected children, keeping 27 as controls. Seven of the 30 became infected, showing that *H. nana* is capable of developing in mice, producing worms to all appearances identical with *H. fraterna*. To prove identity definitely it would be necessary to show that man can be infected with eggs of *Hymenolepis* from the rat or mouse. This has not yet been done.

In his experiments in England the author obtained a much larger proportion of successful results from feeding mice with eggs of *H. fraterna*, and the difference is ascribed to one or more of three factors: (1) Change of host; eggs which have developed in the human subject for several generations may be adversely affected when first introduced into the mouse; (2) The mice used were full-grown adults, whereas the worm develops much more readily in young animals; (3) The mice were healthy and well fed in the Lisbon experiments whereas those in London were in poor condition. The sizes of the eggs from *H. nana* were found to be the same in small and large specimens of worms, and, as has been acknowledged by BAYLIS, who examined several of the author's specimens, no large gaps could be found in the ascending scale of total size; *H. longior* can thus be no longer regarded as a valid species. It is almost certain from the work recorded in the present paper that *H. nana* and *H. fraterna* are identical, and, if so, the name "*H. fraterna*" also lapses. On feeding mice with eggs of *H. diminuta* no results were obtained, JOYEUX's work being confirmed in this respect.

H. H. S.

BAYLIS (H. A.). **The Range of Variation of** *Hymenolepis nana* **in Rats and Mice.**—*Parasitology.* 1924. Dec. Vol. 16. No. 4. pp. 415–418. [2 refs.]

From examination of a number of specimens obtained by Dr. WOODLAND from experimental feeding of mice with eggs of *Hymenolepis nana* and a consideration of his own previous work on this genus the

author concludes that *H. longior* is not a valid species but that gradations are met with between the *H. nana* with mature segments appearing about 75 from the head and the "*H. longior*" maturing at about the 250th segment, and that, consequently, all the specimens, since they are morphologically similar though they vary widely in total length and in the number of segments, belong to a single species, *H. nana*.

H. H. S.

GRAYBILL (H. W.). **The Life-History of** *Hymenolepis nana* **v. Sieb.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1924. Oct. 23. Vol. 18. No. 4. pp. 217–218. [2 refs.]

A brief paper adducing evidence of the direct development of *Hymenolepis nana* in the mouse, but neither so full nor so convincing as other papers already published on the same subject in this country.

H. H. S.

INDIAN JOURNAL OF MEDICAL RESEARCH. 1925. Jan. Vol. 12. No. 3. p. 579.—**Note on** *Hymenolepis nana*. [Communication received by the Editor from Colonel Clayton LANE.]

Attention is drawn to records of the occurrence of *Hymenolepis nana* in man in India, viz., LANE 1909, JONES 1910, REANY 1912, STEWART 1916, and others which precede the record which NANAVUTTY recently presumed to be the first for India.

R. T. L.

KAMADA (Ryonosuke). [**Hemolytic Substance found in the Body of** *Hymenolepis diminuta*. **On the Feature of Blood of the Albino Rat infested by this Parasite.**]—*Aichi Igakkwai Zasshi* (*Jl. of Aichi Med. Soc.*). 1924. July. Vol. 31. No. 4. [Summarized in *Japan Med. World*. 1924. Dec. 15. Vol. 4. No. 12. pp. 332–333.]

A haemolytic substance occurs in small amount in the body of *Hymenolepis diminuta*, and comprises an oil acid and a lipoid saline soluble substance. Albino rats affected with this parasite are anaemic, and the eosinophile cells in their blood are increased.

R. T. L.

DERVIS (Themistocles). *Taenia solium* **als Ursache einer Anaemia perniciosa.**—*Muench. Med. Woch.* 1924. July 11. Vol. 71. No. 28. p. 942. [1 ref.]

Anaemia perniciosa caused by *Taenia solium* is very seldom reported. This apparently justified the communication of the following case.

The patient (female) was for some months ailing with faintness, palpitation, loss of appetite, sometimes diarrhoea, and deafness. Leading symptoms: burning and vesicles on the tip of the tongue, itching of the nose. Objective signs: straw-coloured retina very pale, breath foetid; tongue reddened, especially on the tip, covered with vesicles and rhagades; tender. Over the pulmonalis, systolic murmurs, and also venous hums. Increased motility of the stomach, achylia gastrica. In the stool, *Taenia solium*. No occult bleeding. Spleen enlarged. Wassermann and Pirquet reaction negative. No plasmodia of malaria. Blood: haemo-

globin 30 per cent., red blood corpuscles 900,000, white blood corpuscles 4,500, colour index 1·6. Leucocytes 34, lymphocytes 60, monocytes 2, eosinophilic cells 2, myelocytes 2 per cent., polychromatic erythrocytes, typical megaloblasts, megalo-, micro- and poikilocytosis. A slow but steady recovery followed the expulsion of the worm and treatment with arsacetin (0·2 gm.). Examination four years later proved absence of any complaint.

R. T. L.

DEW (Harold R.). **The Histogenesis of the Hydatid Parasite** (*Taenia echinococcus*) **in the Pig.**—*Med. Jl. Australia.* 1925. Jan. 31. 12th Year. Vol. 1. No. 5. pp. 101–110. With 15 text figs. [3 refs.]

This paper is full of interest, particularly if read in conjunction with the author's previous description of the development of brood-capsules and scolices [see this *Bulletin*, Vol. 21, p. 209.]

A very complete account is given of the earliest stages of development of the hydatid and of the tissue changes set up in the liver. The study is based on the experimental infection of a series of sucking-pigs, six weeks old, with ripe proglottides of *Taenia echinococcus*. The animals were killed at periods ranging from 8 hours to 5 months later, and the liver was removed and serial sections made. Parasites were found in the portal vein 8 hours after ingestion and in 12 hours they were in the liver. The first cellular reaction on the part of the host consists of mononuclear cells derived from the local connective tissue and the endothelial cells. In 28 hours these are reinforced by lymphocytes, the cells together forming a somewhat diffuse follicle with a few eosinophile cells at the periphery, and beyond that an engorgement of the capillaries with red cells and lymphocytes. By the third day the parasite is completely hidden by this cell-accumulation. In some cases the reaction on the part of the host may overcome the parasite at the end of the first week and bring about its fragmentation. If this does not occur the parasite increases in size and becomes definitely vesicular by the end of the second week. By the 21st day the follicle measures 0·25-0·35 mm. in diameter and is visible to the naked eye. Microscopically, the endothelial cells are arranged radially round the parasite, with many giant cells, apparently the result of fusion of endothelial cells. By this time the external membrane shows signs of lamination. The follicle itself now occupies the greater part of a complete lobule and encroaches on the periportal zone. In three months the diameter is 40–50 mm. and the laminated membrane well developed; in five months the size has again doubled. The bile-ducts act as points of resistance and thus seem to determine pouching of the growing cysts. The liver cells in contact with the adventitial layer undergo pressure atrophy and are replaced by fibrous tissue. This pouching leads to the production of multilocular cysts and at the same time adjacent cysts may fuse, but the complexity does not reach that described in *Echinococcus alveolaris*. Even as late as 5 months there is no trace of the formation of brood-capsules. In some, from the third to the fifth month, retrogressive changes may occur with thickening of the adventitia, destruction of the hyaline laminated membrane, and absorption of the fluid.

H. H. S.

BRYCE (Lucy M.), KELLAWAY (C. H.) & WILLIAMS (F. Eleanor).—**A Study of Hydatid Antigen.**—*Australian Jl. Experim. Biol. & Med. Sci.* 1924. Sept. 15. Vol. 1. Pt. 3. pp. 77–91. With 4 figs. [10 refs.]

In the opinion of the reviewer this paper would be more useful if the subject matter were dealt with in three or four separate contributions. In its present condition statements relating to complement fixation, precipitins, sensitization and antigens are closely interwoven, rendering it necessary to read paragraphs and sentences again and again in order to discover the meaning.

The authors discuss the peculiarity of hydatid fluid as antigen for the precipitin reaction in its becoming inactive after heating to 56° C., and ascribe this to the presence of precipitoid in the heated serum. Deterioration begins at 50° C., and it is not reactivated by addition of fresh complement. The destruction of precipitin, however, does not affect the complement-fixing power of the serum. Though hydatid fluid yields good precipitin reactions, alcoholic extracts of scolices, dried and re-suspended in saline, prove negative—the reverse of what is found to occur for the complement-fixation test. Series of experiments on hydatid anaphylaxis are next described, noting the action on the isolated uterus of a normal guineapig after sensitization with one or with two doses of hydatid fluid. Comparison is drawn between this and ergotoxin and histamine actions. As an anaphylactic antigen hydatid fluid proved far superior to alcoholic extracts of scolices. Regarding the different antigenic preparations the authors carried out tryptic digestion of fresh scolices and of scolices thoroughly extracted with alcohol. Though the latter were not anti-complementary they proved less serviceable for the complement-fixation reaction than ordinary, undigested, scolices extracts. The trypsin extracts of fresh scolices were more satisfactory and were prepared in the following manner :—

"1 cc. of fresh scolices, washed three times with normal saline, was placed in a sterile flask containing 40 cc. of ·4 per cent. of sodium bicarbonate and ·1 gm. of Merck's trypsin. Five drops of chloroform were added, and the flask was then incubated at 37° C. At the end of 2, 4, 6 and 8 hours 10 cc. samples were drawn off, placed in sterile test tubes, and at once heated to 60° C. After cooling, they were neutralized with hydrochloric acid and placed in the ice chest. Before use for complement fixation the chloroform was driven off by bubbling sterile air through the liquid. These solutions proved to be potent antigens, even in a dilution of 1 in 20, and showed no tendency to react with syphilitic sera, but were weakly anti-complementary, even in high dilutions."

Acetone extract of scolices did not give so good an antigen as alcoholic extracts for complement-fixation tests. Alkaline autolysates proved to be potent for the complement-fixation tests but valueless for reactions.

H. H. S.

BISBINI (Bartolomeo). **Einige Betrachtungen ueber die Immunitätserscheinungen und deren Dauer bei der Echinokokkose.** [The Immunity Reactions and their Duration in Echinococcosis.]—*Cent. f. Bakt.* I. Abt. Orig. 1925. Feb. 18. Vol. 94. No. 3/4. pp. 204–207.

Case of a patient, 41 years of age, suffering from hydatid of the liver. The degree of eosinophilia, Casoni's intradermal reaction and complement fixation were determined before and after operation. The eosinophilia

is stated to have been 30 per cent. prior to operation [probably a misprint, since the author states that it remained practically unchanged, between 2 and 4 per cent]. The cutireaction was well marked both before and after. The degree of complement fixation, however, diminished rapidly after the cyst had been surgically dealt with.

H. H. S.

ARCÉ (José). **A propos de l'action des rayons X (radiothérapie profonde) sur les kystes hydatiques.**—*Bull. Acad. Méd.* 1924. Dec. 2. Year 88. 3rd Ser. Vol. 92. No. 40. pp. 1290–1295. With 2 figs.

The author, having tested the effects of X-rays (5 milli-ampères and tension of 200 volts at a focal distance of 40 cm.) for varying lengths of time on "hydatid sand" on a slide under a coverglass, found that the scolices were disintegrated in the preparation exposed to the rays for an hour. He, therefore, tried the same on seven cases a day or two before operation and, on examining the fluid, found in three of them that the scolices were motionless and in some instances disintegrated. He intends to pursue the question further.

H. H. S.

STENHOUSE (H. M.). **Renal Pathology in Filariasis bancrofti.**—*U.S. Nav. Med. Bull.* 1925. Jan. Vol. 22. No. 1. pp. 1–12. With 3 figs & 2 charts.

A large proportion of the inhabitants of St. Croix, W.I., is infected with *Filaria bancrofti*. In the Frederiksted district 20 per cent. of the patients admitted to hospital have the embryos in their peripheral blood. The disease is said to cause early damage to the kidneys which may persist after the death of the parent filariae. 93 out of 100 unselected cases showed albuminuria, and it is common for patients to get up two or three times at night to micturate. The author explains that "the presence of the parasites in the kidneys during the day in some way limits the physiologic function at that time. During the night when the embryos migrate to the periphery it is natural that a compensatory effort should be made to eliminate the accumulated products of katabolism."

The cases are divided into two groups. In the one, in which elephantiasis is absent, the renal tissue is soft and pasty-brown in appearance, tubular casts are seen and embryos may be found. In the other, with elephantiasis, there is gross fibrosis, the capsule is thickened, the parenchyma degenerated and large cysts are common.

H. H. S.

TANON (L.). **Traitement des filarioses vasculaires.**—*Presse Méd.* 1925. Feb. 28. Vol. 33. No. 17. p. 265.

Hectine given by a technique very similar to that used for the treatment of syphilis is recommended by the author for the treatment of filarial infection. The total dose used in a course of treatment is 2 gm. in slight cases, 3 gm. in serious cases. The number of cases treated so far has been few.

R. T. L.

LOW (George C.) & COOKE (W. Ernest). **Bayer "G. 1919" in the Treatment of Filariasis.**—*Lancet.* 1924. Nov. 1. pp. 903–904. [2 refs.]

Bayer "G. 1919," a new preparation manufactured by the same firm as "205," and recommended for the treatment of filariasis, was tried by the authors on a patient suffering from infection by *Filaria bancrofti.* In order to test its efficacy the embryos seen in a measured quantity of blood, 20 cmm., taken at the same hour each night, were counted from day to day. The drug was administered intravenously in doses of 0·5 gm. dissolved in 5 cc. distilled water once a week between 2 and 3 p.m. for 10 weeks. Before treatment was started the average number of embryos was 230. On the night of the first injection there was a marked fall to 136, but thereafter the fluctuations were considerable, varying between 75 and 200. There was no steady diminution as would be expected from a direct action of the drug on the adult Filariae.

The preparation was reputed to cause nephritis and dermatitis, but, though there was a little albuminuria, no casts appeared and there was no sign of dermatitis throughout the course of treatment. The authors concluded that, judging from this single case, "the drug has failed to justify the claim of its producers that it has a beneficial effect in cases of filariasis."

H. H. S.

ROSE (F. G.). **"Bayer 205" in Filariasis.**—*Proc. Internat. Conference on Health Problems in Trop. America.* 1924. pp. 257–270. [12 refs.] [United Fruit Company, Boston, Mass.]

In controls the numbers of microfilariae in the circulating blood periodically wax and wane, but the numbers never decline in so pronounced a manner in untreated controls as during, and for some time after, the administration of "Bayer 205." Moreover, this temporary fall is preceded by a very marked rise in all cases. *In vitro,* using oxalated blood, no evidence could be obtained that "Bayer 205" exerted any toxic effect on the embryos. Nor was any *in vitro* effect produced in Bayerised blood, and it is assumed therefore by the author that the drop in the number of embryos after the administration of this drug is due to its effect upon the adult worms.

R. T. L.

JEANSELME (E.) & BLOCH (Marcel). **Adéno-lymphocèle filarienne.**—*Bull. Soc. Française Dermat. et de Syph.* 1924. July. No. 7. pp. 374–375.

An account of a boy of 14 who had lived until he was 11 in Guiana, then for 4 months in Guadeloupe, and then in Paris. There was a swelling just below the left groin the size of an orange, somewhat nodular. The

inguinal glands were enlarged. There was no oedema or thickening of the skin, but the blood showed an eosinophilia of 20 per cent. Puncture of the swelling revealed embryos of *F. bancrofti*. The patient had been sent from the surgical side with a view to diagnosis and suggestions for treatment. Intravenous injection of tartar emetic was advised.

H. H. S.

SAITO (Genji). **[On Nodules in the Hernia Sac formed by the Adult Worm of Filaria.]**—*Hokuetsu Igakkwai Zasshi* (*Jl. of Hokuetsu Med. Soc.*). 1924. Apr. Vol. 39. No. 1. [Summarized in *Japan Med. World.* 1924. Oct. 15. Vol. 4. No. 10. p. 266.]

An inguinal hernia was surgically treated in a case of chyluria, without other filarial symptoms. During the operation a nodule was found in the sac and on microscopical examination proved to contain adult filaria worms.

R. T. L.

DUPUY. **Note préliminaire sur l'onchocercose.**—*Bull. Méd du Katanga.* 1924. Dec. Vol. 1. No. 6. pp. 258–260.

An examination of natives at Bukama, where numerous caravan routes converge, showed that onchocerciasis was especially prevalent in those coming from the district of Kabinda. The author has recognized in infected persons the presence of cysts, of lymphatic enlargements, filarial itch and localized epidermal lichenization which is reported by others to be associated with this infection. Anti-scabic treatment does not afford any relief to this type of itch.

R. T. L.

FÜLLEBORN (Friedrich). **The "Blinding Filaria" of Guatemala** (*Onchocerca caecutiens*, **Brumpt 1919**).—*Proc. Internat. Conference on Health Problems in Trop. America.* pp. 241–255. [19 refs.] [United Fruit Company, Boston, Mass.]

The *Onchocerca caecutiens* of Guatemala is morphologically indistinguishable from *O. volvulus* of Africa. In Africa, however, it is seldom associated with eye diseases, while various authors have associated it with dermatitis. The location on the scalp only is infrequent in Africa but common in Guatemala. Fülleborn and ZSCHUKKE found the Onchocerca in 70 per cent. of the labourers on one of the plantations in Guatemala, but only in two was there appreciable diminution of vision on objective examination. They formed the opinion that the Onchocerca carriers seen by them were perfectly healthy individuals and they deprecate the proposed *prophylactic* removal of the nodules. Injection of cocaine and other preparations into the parasitic cysts might be tried. The larvae of *O. caecutiens* occur in large numbers in the skin as in the case of *O. volvulus*. The microfilariae are indistinguishable.

R. T. L.

i. FAIRLEY (N. Hamilton) & LISTON (W. Glen). **Studies in Dracontiasis.** Part III.* **A Note on Various Local Indian Remedies.**—*Indian Jl. Med. Res.* 1924. Oct. Vol. 12. No. 2. pp. 347–350. With 1 plate. [2 refs.]

ii. ——. Part IV. **The Clinical Picture. An Analysis of 140 Cases.**—*Ibid.* pp. 351–367. [35 refs.]

iii. ——. Part V. **Observations and Reflections on Intravenous Medication with Special Reference to Tartar Emetic.**—*Ibid.* pp.. 369–374. [10 refs.]

iv. ——. **Studies in Dracontiasis.** Part VI. *Indian Med. Gaz.* 1924. Sept. Vol. 59. No. 9. pp. 429–438. With 11 text figs. [26 refs.]

i. Native remedies are numerous, but without beneficial results. The drugs given include santonin, white copaiba, asafoetida, ammonium chloride, the root of white oleander and rock salt. Special dietaries are also advocated by the vaidya. Local applications are universally employed, especially extract of aloes and poultices of onion, cactus, neem and betel leaves. The old Sanskrit remedy of poulticing day and night with the young sprouts of the Baman tree mixed with gur and linseed meal has recently been advocated by CHITALE (1912). Various methods of mechanical extraction are described in the paper, which is accompanied by an interesting plate illustrating curious instruments used by vaidya in operating on guineaworm.

ii. The incubation period ranged from 10 to 14 months. The maximum incidence of clinical dracontiasis in the Madras Presidency occurred in the months of March, April, May and June. Figures are given showing the frequency of recurrent dracontiasis in endemic areas. The average number of worms per individual was 1·9. Multiple infestations are frequent during the seasonal attack. Individual resistance is a real factor determining disease incidence, exposure not necessarily being followed by infection. The most characteristic clinical sign of the early systemic manifestations is urticaria. The cutaneous lesions were sometimes associated with gastro-intestinal disturbances and occasionally with severe dyspnoea, giddiness and syncopal attacks. Practically all the complications, except calcification, are dependent on secondary infection. The blood picture varies with the presence or absence of sepsis and intestinal helminthiasis.

iii. The majority of cases of guineaworm do not present themselves for clinical examination until the blister has ruptured. This occurred in 71·1 per cent. of the writers' series of 218 cases. In 43·7 per cent. septic complications were already established. In the latter group of cases mechanical extraction is necessary. In the minority specific therapy would be of real value if given prior to the rupture of the blister, but tartar emetic has proved neither to be lethal to the female or its embryos nor *per se* to modify the clinical course of the disease and its use has been entirely abandoned.

iv. The mode of surgical and mechanical extraction varies according to the stage of evolution of the case and the presence of complications. Rupture of the worm is liable to be followed by urticaria, vomiting, etc., but after the formation of the blister this need not be feared. The

* For Parts I and II see this *Bulletin*, Vol. 21, pp. 567 and 956.

blister should be aspirated to limit the subsequent ulcer. When the worm is closely convoluted excision *en masse* is advised. Intermittent traction with massage is advocated in other cases. A new operative technique is described. Injection locally of antiseptics is not to be encouraged as the danger of adding chemical inflammation of the tissue more than outweighs the advantages. Injection of 1 in 1,000 sol. of adrenalin hydrochloride immediately relieves the prodromal urticaria, erythema and asthmatic manifestations.

R. T. L.

PELTIER (M.) & DOMINIQUE (H.). **Note sur l'action du mélange émétique-extrait d'organes dans le traitement de la draconculose.**—*Bull. Soc. Path. Exot.* 1924. Nov. 12. Vol. 17. No. 9. pp. 846–850.

Dracontiasis is prevalent in Togo, many patients having multiple infection. Treatment by tartar emetic intravenously gave good results, but cure was slow and patients in many cases ceased to come up for injection. A mixture of organ extract and tartar emetic was, therefore, made in the following way: Not having rabbits at disposal the author took the liver of a sheep; one volume of the pulp was mixed with two vols. of normal saline and centrifuged. The product was next placed at 37° C. for 5-6 hours and then for 20 hours on ice. The yellowish supernatant fluid was filtered. For use, equal parts of this and 1 per cent. antimony tartrate in normal saline were injected intravenously (intramuscular injection gave rise to intense pain), starting with 1 cc. Four to five hours later there was rise of temperature with shivering and, perhaps, vomiting, but these symptoms never appeared to be dangerous. Injections were made every 4 days, increasing by 1 cc. each time up to a maximum of 5 cc. Five cases are recorded; from one patient 11 worms were extracted. They began to come out the day following the first injection.

H. H. S.

DELAMARE & DJÉMIL (Said). **Filaires de Médine calcifiées.** [Société Anatomique. 1923. June 30.]—*Etudes & Notes. Chaire de Médecine exotique de la Faculté de Constantinople.* p. 106.

This is a brief account of a girl, 10 years of age, showing in the legs fifteen scars due to removal of *Dracunculus medinensis*, and by X-rays several calcified fragments of other specimens in the tissues.

H. H. S.

DELAMARE (G.) & ACHITOUV. **Filaire de Médine calcifiée; cellules géantes de corps étrangers, infiltration embryonnaire et sclérose.**—*Bull. Soc. Path. Exot.* 1924. Nov. 12. Vol. 17. No. 9. pp. 788–790.

The histological details of a section of tissue showing "helminthic pseudotuberculoma" are described. The condition was due to irritation set up by a dead *Dracunculus medinensis* with formation of giant cells.

H. H. S.

STILES (C. W.) & BROWN (Gertrude). **The Present Status of the Parasitic Nematode Family** *Ascaridae.*—*Public Health Rep.* 1924. Aug. 8. Vol. 39. No. 32. pp. 1957–1962.

The nematode genus *Ascaris* Linnaeus 1758 contained so many and varied species that these have gradually been sorted into three superfamilies, several families and numerous genera. In the present

paper the authors have brought together the subfamilies and genera of the family Ascaridae, at present defined as parasitic nematodes with three lips. The various forms are defined and arranged in a characteristically American " watch your step " tabulation.

R. T. L.

GOLDSCHMIDT (Eduard). **Beiträge zur Diagnose und Therapie der Askaridiasis.**—*Muench. Med. Woch.* 1925. Jan. 9. Vol. 72. No. 2. pp. 52–54. With 1 text fig. [13 refs.]

The author first points out the difficulties which may arise in the diagnosis of Ascaris infection in patients whose faeces contain atypical forms of ova. These forms are, in his opinion, the result of absence of fertilization and the greater susceptibility of such ova to the action of the digestive juices.

The various drugs employed in treatment are divided into four groups: (1) The aromatic series of derivatives, such as naphthalin, santonin, vialongaperlen (santonin plus tanacetin), thymol, etc.; (2) The chenopodium group including, besides the oil itself, oxural, wermolin and chenoposan; (3) Aluminium preparations, of which Oxymors is an example; (4) Helminal. The action of the members of the first two groups is, in small doses, to stimulate the parasites; in larger doses to narcotize them; in still greater doses to kill. The therapeutic doses are those which produce the second stage (narcosis of the parasite); beyond these there is danger of toxic action to the patient.

The author prefers to give chenopodium in the " gelodurat capsules " of Pohl, so that they may pass intact through the stomach and exert their action in the intestine. He gives it thrice daily at short intervals, namely, at 8 and 10 a.m., and 12 noon, followed by a purge two hours later. These capsules are prepared in two strengths; one for children containing 6 drops of the oil, the other for adults containing 16 drops.

H. H. S.

NISHIGORI (Masawo) & OHBA (Tatsunosuke). [**On the Route of Migration in the Host's Body taken by the Ascaris.**]—*Nissin Igaku* (*Progress in Med.*). 1924. June. Vol. 13. No. 8. [Summarized in *Japan Med. World.* 1924. Oct. 15. Vol. 4. No. 10. p. 263.]

From a study of serial sections of experimentally-infected animals, the author concludes that the main route of migration of ascaris larvae is by the blood and lymph capillaries of the intestinal wall, thence *via* the portal vein, or through the lymph stream into the thoracic duct, and thus to the right ventricle and the lungs. Some of those entering the lymph could also reach the portal vein *via* the lymphatic ducts and reach the lungs. Exceptionally some might pierce the gut wall and get into the abdominal cavity, but still find their way into the liver stroma and thence into the lungs.

R. T. L.

SUYEMORI (S.). **On Pathological Changes in the Eye during the Incipient Stage of Infection with Ascaris. (Experimental Study.)**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. of Formosa*). 1925. Feb. No. 239. English summary p. 1. [In Japanese.]

Embryonated ascaris eggs from pigs were administered, by the mouth, to guineapigs and a monkey. Among the ensuing symptoms aud pathological changes were anisocoria and retinal haemorrhages. Those larvae

which had been carried by the blood stream to the eye were seen in the uveal tract, retina, optic nerve, etc.; they were especially abundant in the Harderian gland (in the guineapig), and in the choroid. Some larvae had produced organic changes in the surrounding tissues, chiefly comprising round cell infiltration, mainly of eosinophile cells and of polynuclear leucocytes and giant cells. Especially in the choroid were haemorrhages and worm nodules. No larvae occurred either in the lens or cornea. In the guineapig the ascaris larvae could be seen in abundance moving with the blood in the ocular organs 30 hours after infection. The majority doubtless passed on with the blood stream or lymph, but some remained and died in these organs.

R. T. L.

RANSOM (B. H.), HARRISON (W. T.) & COUCH (J. F.). **Ascaris Sensitization.**—*Jl. Agric. Res.* Washington. 1924. May 10. Vol. 28. No. 6. pp. 577–582. With 1 plate. [8 refs.]

Susceptibility to the toxins of Ascaris appears to be fairly common; the symptoms are similar to those of protein sensitization and they have been ascribed to volatile emanations from the worm. The authors tested the cutaneous reaction of certain sensitive persons to various extracts obtained from Ascaris, some containing globulin, some albumin, others being protein-free. They showed that the substance in the aqueous extracts which causes this reaction in sensitive individuals is absent from the globulin fraction, but present in the albumin fraction and also in the protein-free filtrate after removal of both these by precipitation with ammonium sulphate. Further, it is not volatile between 20° and 100° C.; it survives the latter temperature for 15 minutes, but is destroyed by less than an hour's exposure.

H. H. S.

SEISHIN (Ryu.). **On the Treatment of Ascariasis with Santonin Suppositories.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. of Formosa*). 1924. Sept. No. 236. English summary p. 7. [In Japanese.]

Santonin suppositories used alone are 10 per cent. more effective than a mixture of calomel and santonin used internally, even though in the former case the quantity of santonin used is about one-third of the doses given in the latter cases. When the santonin suppository is inserted and calomel is used internally in addition, 90 per cent. of the patients are cured. This suppository should, therefore, be given whenever there is any difficulty in administering santonin internally. Within 30 minutes of inserting a santonin suppository a santonin reaction can be obtained in the patient's urine.

R. T. L.

PAYNE (Florence K.), ACKERT (James E.) & HARTMAN (Ernest). **The Question of the Human and Pig** *Ascaris.*—*Amer. Jl. Hyg.* 1925. Jan. Vol. 5. No. 1. pp. 90–101. [13 refs.]

The identity or otherwise of the Ascaris of man and the pig gravely affects control of ascariasis in the tropics. The authors have attempted a solution: (1) By feeding embryonated eggs of human ascaris to pigs, and of pig ascaris to primates; (2) by studies on the incidence of human and pig ascaris in Trinidad. Five young pigs were repeatedly fed with infective ascaris eggs of human origin. All suffered respiratory disturbances and other systemic disorders but no adult worms were

found subsequently in the gut at post-mortem. The administration of ascaris eggs of human origin gave rise to severe "thumps" in the pigs. Infective ascaris eggs from the pig were swallowed by one monkey and by two human subjects. The faeces failed to give positive results throughout a subsequent period of several months. The incidence of ascaris in man in Trinidad varied from 20 per cent. to 70 per cent., and in the pig from 3·5 per cent. to 10·8 per cent. In the vicinity of Arouca, one of the principal swine-raising regions, the incidence of ascaris in the pig was 10·8 per cent. and in man 64·3 per cent. The authors conclude that their experimental studies show a definite physiological difference between the ascaris of the pig and that of man.

R. T. L.

HARTMANN-KEPPEL (G. L.). **L'ascaridiase du foie et des voies biliares.**—*Jl. de Chir.* 1923. Vol. 21. pp. 157–169. [16 refs.]

Two cases of infection by *Ascaris lumbricoides* in which the liver was involved are recorded in detail. The first, a soldier aged 34 years, suffered from attacks of fever lasting 3 to 7 days with pain in the right hypochondrium and right shoulder. The faeces contained ova of ascaris and also adult ascaris and oxyuris. During the three weeks prior to admission there had developed a swelling below the right costal margin in front, with exacerbation of the fever and pain. At operation an abscess of the *left* lobe of the liver was found and two female ascarides, 19 and 24 cm. in length, apparently dead. The second patient was a girl of 12 years with very similar symptoms, and from an abscess, likewise in the left lobe, a dead female ascaris, 23 cm. long, was removed.

The remainder of the paper deals with the pathological anatomy, symptoms, diagnosis and treatment. The author states that the liver and biliary tract may be affected in different stages of development of the worm. Firstly, where the pulmonary circuit is cut out altogether, the immature larvae may set up hepatitis, either circumscribed or acute and diffuse; secondly, where the stay in the lungs is interrupted, the larvae may become adult in the liver, setting up single or multiple abscesses, or, in the bile ducts, angiocholitis with or without obstruction; thirdly, the worms may migrate when small via the bile ducts and give rise to abscesses.

H. H. S.

LEVIN (Joseph J.) & PORTER (Annie). **Surgical and Parasitological Notes on Four Cases of Intestinal Obstruction due to Accumulation of very Large Numbers of Round Worms.**—*Brit. Jl. Surgery.* 1924. Vol. 11. No. 43. pp. 432–438. With 3 text figs.

Four cases are recorded, three European girls, aged 8, 9 and 10 years respectively, all from the same orphanage, and one Hottentot boy, aged 11 years.

The boy had signs of intestinal obstruction, and at operation 851 worms were removed from incisions into the jejunum; 48 more were passed subsequently. The patient made an excellent recovery. The others were provisionally diagnosed as cases of acute appendicitis, but operation was undertaken for the obstruction. In one, "several hundreds of worms were removed," and a few more came away later; this patient died. From the second, 737 were removed at operation and another 253 were passed

subsequently, 990 in all, and the patient recovered. The third was found to have already a perforation of the bowel which was also gangrenous. 268 were removed, in addition to "hundreds thrown away" inadvertently before they were counted. Death took place the same night. In all four the jejunum was the part involved. The average length of the worms was, in one case, 3½ in., in another 5½; in a third the males were 5 in., and the females 6¾ in.

H. H. S.

ALLES (E. C.). **Acute Intestinal Obstruction caused by Dense Accumulation of Round Worms.**—*Jl. Ceylon Branch of the Brit. Med. Assoc.* 1924. Sept. Vol. 21. No. 2. pp. 123–124.

The case of a woman, 24 years of age, admitted to hospital for symptoms of acute intestinal obstruction. At operation there was noticed to be a peritonitis, and two worms [presumably Ascaris] were found to have penetrated the gut-wall. The small intestine was packed densely in parts with round worms; 547 were removed by incision into the bowel and nearly as many more were left. Death occurred the following day from peritonitis.

H. H. S.

GENTILUCCI (Giuseppe). **Occlusione intestinale per una rare anomalia congenita del colon trasverso—Raro incidente da ascaridi durante la narcosi.** [Intestinal Occlusion due to a Rare Congenital Anomaly of the Transverse Colon. A Rare Incident caused by Ascarides during the Narcosis.]—*Policlinico.* Sez. Prat. 1924. June 30. Vol. 31. No. 26. pp. 839–841. [5 refs.]

During an operation for intestinal obstruction, the patient, a boy of 16, while under deep narcosis, became suddenly cyanotic, presenting signs of occlusion of the air-passage, and retching strongly. On opening the mouth a mass of ascarides was seen blocking the trachea and pharynx, while some of them wriggled out of the nose. Thereupon the head of the patient was turned face down, the ascarides were extracted, artificial breathing and inhalation of oxygen applied, and the patient recovered.

This incident seems to have been due to washing out of the stomach before the operation, as well as to the manoeuvring of the operator in the abdomen setting up antiperistaltic movements of the bowels and the effect of the ether upon the worms, which became excited and took refuge in the upper part of the intestinal canal as the lower part was blocked. The author urges an anthelmintic treatment of patients coming from places the population of which is known as worm infested before submitting them to any operative measure.

R. T. L.

DICKINSON (R. F.). **A Case of Human Infestation with** *Belascaris mystax.*—*Jl. Roy. Army Med. Corps.* 1925. Feb. Vol. 44. No. 2. p. 111.

In Mauritius, a girl, 3 years old, daughter of British parents of good social position, passed a worm in a copious putty-coloured stool. The faeces contained the fine honeycomb marked eggs of *Belascaris mystax*, and the adult was identified, after serial sectioning, by Dr. Clark H. YEAGER, of the International Health Board staff.

R. T. L.

i. GOHEEN (R. H. H.). *Ascaris lumbricoides.*—*Jl. Assoc. Med. Women in India.* 1925. Feb. Vol. 13. No. 1. pp. 11–16.

ii. LE ROY DES BARRES (A.). **L'ascaridiose hépatique.**—*Rev. Méd. et Hyg. Trop.* 1924. Aug.-Dec. Vol. 16. No. 6. pp. 161–167.

iii. SAWADA (Taku) & OHKI (Tsunematsu). [**On the Influence of Radium Emanation against the Eggs of the** *Ascaris lumbricoides.*]—*Aichi Igakkwai Zasshi* (*Jl. of Aichi Med. Soc.*). 1924. Sept. Vol. 31. No. 5. [Summarized in *Japan Med. World.* 1925. Feb. 15. Vol. 5. No. 2. p. 45.]

iv. KOBAYASHI (Muneharu). [**Experimental Elimination of Ascaris by the Use of a New Anthelmintic "Soveran."**]—*Chugwai Iji-Shimpo* (*Internat. Med. Jl.*). 1924. Sept. Vol. 43. No. 18. [Summarized in *Japan Med. World.* 1924. Dec. 15. Vol. 4. No. 12. p. 329.]

i. The author finds that in certain parts of India the incidence-rate of *Ascaris lumbricoides* is 90 per cent. and over. Two cases had febrile symptoms, one of which was regarded for a time as enteric; both cleared up after a vermifuge had expelled the worms.

ii. A general account of the surgical conditions of the liver arising from the presence of Ascaris in that organ, culled from various records.

iii. Radium emanations in small doses have little influence on the development of Ascaris eggs; if any, the rate is accelerated. In large doses many of the eggs are destroyed.

iv. The author reports satisfactory results from the clinical use of "Soveran" in cases of ascaris infection, but the summary gives no indication of the chemical composition of "Soveran."

R. T. L.

JAPHA (Arnold). **Die Verbreitung von** *Oxyuris vermicularis* **bei Schulkindern.**—*Muench. Med. Woch.* 1925. Mar. 20. Vol. 72. No. 12. pp. 473–474. With 1 text fig. [14 refs.]

The author examined 202 school children in 1922 and found 66 per cent. of them infested with Oxyuris, and again among 300 other children between the ages of 6 and 14 years 73 per cent. This is considerably more than was given in pre-war records, and the high rate is ascribed to the general uncleanliness from scarcity of soap at the end of the war and to overcrowding.

H. H. S.

PHILPOT (F.). **Notes on the Eggs and Early Development of Some Species of Oxyuridae.**—*Jl. Helminthology.* 1924. Sept.-Nov. Vol. 2. Nos. 4 & 5. pp. 239–252. With 4 text figs.

Oxyuris vermicularis lays its eggs as soon as the worm comes into contact with air. The eggs show a peculiar and characteristic "emergence" area. Aeration is a very important factor in the successful development of the ova in water. Embryos emerge spontaneously from the egg shells by piercing the emergence area after about 70 hours in tapwater at 22° C. Whereas "tadpole" embryos were disintegrated by digestive juices, coiled embryos of older cultures hatched and were extremely active in the same media. No success followed attempts to demonstrate skin penetration, nor could rats or mice be experimentally infected with *O. vermicularis.* Studies on various other species of Oxyuridae, including the life histories of *Syphacia obvelata* and *Oxyuris tetraptera* of mice, are included in the paper.

R. T. L.

KEHL (Renato). **O tratamento da oxyurose.**—*Brazil-Medico.* 1924. Aug. 16. Year 38. Vol. 2. No. 7. pp. 114–115.

The author has cured several cases of oxyuriasis with Butolan. For adults he prescribes three tablets of 0·50 gm. each daily up to a total dose of 20 tablets, followed by a purgative. The doses for children are according to age, an average of a half tablet for those under 10 years, and one-quarter for those under 2. The good results were confirmed by Dr. TRAVASSOS of the Oswaldo Cruz Institute.

R. T. L.

LORENTZ (Friedr. H.). **Eine einfache Oxyurenbehandlung.** [A Simple Treatment for Oxyuris.]—*Med. Klin.* 1925. Jan. 18. Vol. 21. No. 3. pp. 95–96.

The author discusses the value of WEINBERGER'S "Simple and Reliable Treatment of Oxyuris Infection" by rectal injection of Chloramin which BRÜNING had objected to as neither simple nor reliable [this *Bulletin*, Vol. 21, p. 962].

He states that the eggs of Oxyuris develop only within the anal ring, in the dried or drying faeces there, and that the irritation set up is due to the emergence of the developing larvae. Moisture is, therefore, inimical to them, and the value of the treatment depends largely upon the water injected, and he recommends that after each action of the bowels a thorough washing of the rectum should be carried out. By this means he finds that in from 8 to 14 days the worms disappear permanently.

H. H. S.

GEINITZ (Rudolf). **Eine einfache Oxyurenbehandlung.**—*Med. Klin.* 1925. Apr. 3. Vol. 21. No. 14 (1060). pp. 507–508. [1 ref.]

The author inveighs at some length against LORENTZ'S "simple and successful method" of treating Oxyuris infection by rectal injections of water, and states that he has found the eating of raw carrots, either plain or mashed, gives excellent results. The chemical action of this food is outside his province, but, he suggests, might be profitably investigated. He sums up its use as harmless, handy, cheap and reliable.

H. H. S.

LUZZATTI (Tullio). **Un efficace metodo di trattamento contro l'ossiuriasi.**—*Pediatria.* 1924. Aug. 15. Vol. 32. No. 16. pp. 965–966.

——. **Sul trattamento cloroformico dell' ossiuriasi.**—*Ibid.* 1925. Mar. 15. Vol. 33. No. 6. p. 319.

The mixture of chloroform and castor oil recommended by G. ALESDRINI for the treatment of hookworm and taenia has proved very efficacious in the cure of oxyuriasis. Pure anaesthetic chloroform should be used in dose of gm. 2 in a quantity of castor oil. The optimum amount varies with age. Three doses at intervals of a fortnight should eradicate the infection.

R. T. L.

VERNE (J.). **Etude histologique d'un cas d'appendicite à oxyures.**—*Ann. Parasit. Humaine et Comparée.* 1925. Jan. Vol. 3. No. 1. pp. 60–67. With 4 text figs. [7 refs.]

A boy of 10 years who had symptoms suggestive of petit mal and pain over McBurney's point had his appendix removed. Its lumen was found to be constricted in three situations and in nodosities were seen aggregations of 3 or 4 specimens of Oxyuris, all females. The mucous membrane was excoriated and the lumen contained altered blood in which the parasites were living. At the sites occupied by the worms the epithelial cells were ciliated, a condition attributed to mechanical irritation from their presence. In the submucosa there was congestion associated with a local eosinophilia and accumulation of plasma cells.

H. H. S.

HARRIS (William H.) & BROWNE (Donovan C.). *Oxyuris vermicularis* **as a Causative Factor in Appendicitis.**—*Jl. Amer. Med. Assoc.* 1925. Feb. 28. Vol. 84. No. 9. pp. 650–654. With 3 text figs. [13 refs.]

In an uninterrupted sequence of 121 cases of operative appendicitis *Oxyuris vermicularis* infestation occurred in 22 appendixes. The results of gross and histologic studies show conclusively that these worms play a definite pathogenic rôle in the causation of the lesions in the appendix. It is important to consider the likelihood of *O. vermicularis* infection in all cases of chronic recurrent appendicitis. The authors believe that insufficient attention has been given to the parasite by clinicians, surgeons and pathologists. Three instructive microphotos illustrate the text.

R. T. L.

MARZIANI (Luigi). **Calcolo appendicolare di natura parassitaria.**—*Policlinico.* Sez. Prat. 1924. Apr. 21. Vol. 31. No. 16. pp. 514–515. [5 refs.]

The patient, female, aged 40, was operated on in consequence of appendicitis gangrenosa perforativa with diffused purulent peritonitis. There was found in the appendix at the site of perforation a hazelnut-sized coprolith of hard consistence. Microscopical examination proved that the centre of the calculus consisted of an immense number of eggs of Trichocephalus, forming a conglomerate. In the appendix itself no mature parasites were found.

Apparently in this case the appendicitis was not caused by the parasites, but by their eggs which, forming the nucleus of the coprolith, produced inflammation. The calculus was therefore of intestinal origin and had grown within the appendix until, by superposition of salts and food detritus, it blocked the lumen and caused perforation.

R. T. L.

GRUBER (Gg. B.) & v. HABERER (H.). *Trichocephalus trichiurus* **als lebensgefährlicher Parasit.** [*T. trichiurus* as a Dangerous Parasite.]—*Wien. Med. Woch.* 1924. Sept. 20. Vol. 74. No. 39. pp. 2015–2022. [12 refs.]

Two cases are here recorded. The first was in a man of 48 years who had suffered from dysentery in 1916. Subsequently, he complained of colic and diarrhoea and was anaemic, and an ileocaecal swelling appeared. This was removed by resection in 1919, and when the specimen was examined at the Mainz Pathological Institute the caecum showed inflammatory changes in the mucosa, submucosa and muscularis with venous thrombosis

and local eosinophilia, and twelve specimens of *Trichuris trichiura* were found. The condition is ascribed definitely to the helminthic and not to the dysenteric affection.

The second patient was a man of 38 years with symptoms of a mild chronic obstruction and a swelling in the right iliac region. Under the belief that this mass, which was as large as a man's head, was tuberculous in nature, laparotomy was performed, and a tumour involving the last three feet of the small intestine and adjacent part of the caecum was removed. On examination the lymph glands in it were found to be enlarged, but without any signs of tuberculosis; the mucosa of the caecum was congested, bluish-red, oedematous and wart-like from irregular swellings with small patches of ulceration. Fifteen specimens of Trichuris were removed from the mucosa.

H. H. S.

NITZULESCU (Virgil). **Ueber das häufige Vorkommen des** *Trichocephalus trichiurus* **in Rumänien.** [Frequent Occurrence of *T.t.* in Rumania.]—*Cent. f. Bakt.* 1 Abt. Orig. 1924. Oct. 15. Vol. 92. No. 7/8. pp. 542–546. [13 refs.]

Statements suggesting that infection by *Trichuris* is rare in Rumania are, according to the author, due to want of examination, for, on examining 30 patients suffering from various chronic complaints, he found this parasite in 26 of them, namely, in 10 of 11 women, and in 16 of 19 males.

H. H. S.

VAN THIEL (P. H.). **Onderzoek omtrent het dooden van spiertrichinellen door koude.** [The Effect of Cold on Trichina in Muscle.]—*Tijdschr. v. Vergelijk. Geneesk. enz.* Leyden. 1924. Dec. 30. Vol. 11. No. 1. pp. 48–65. [9 refs.] English summary pp. 66–67.

In experiments carried out by the author a refrigeration for four hours was necessary to destroy the infective power of trichina larvae encysted in small pieces of flesh of the guineapig. When, however, the pieces of flesh were cut into smaller pieces death followed after five minutes exposure at —20° C. This shows that the dimension of the infected meat is a factor which must never be overlooked. Moreover, the larvae vary in their resistance to cold, but this is not due to difference in age. A useful technique for the determination of the presence of adult trichina in the intestine is to shake the contents with antiformin and centrifuge.

R. T. L.

GUGGIARI (P. Bruno) & CROVATO (Gustavo). *Oxyuris incognita* o *Heterodera radicicola?*—*Rev. Soc. Cientifica d. Paraguay.* 1924. Oct. Vol. 1. No. 6. pp. 83–84.

The faeces of a child, age 7, showed numerous ova of "*Oxyuris incognita,*" or *Heterodera radicicola.* The eggs alone are found in faeces and usually occur in the summer. Variations are due to the different culinary manipulations to which vegetables are submitted before consumption. The ova disappeared from the stool without treatment.

R. T. L.

LANE (Clayton). **The Mass Diagnosis of Ankylostome Infestation. (Parts VIII to XIII.)**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1924. Nov. 20 & Dec. 11. Vol. 18. Nos. 5 & 6. pp. 278–310. With 13 figs. [8 refs.]

Continuing previous studies [this *Bulletin*, Vol. 20, p. 947 ; Vol. 21, p. 574], and particularly the unsuccessful efforts to enrich the preparation and to contract the examination area obtained by direct centrifugal flotation (D.C.F.), a long series of counts shows the former aim to be attainable by the simple expedient of lifting off rapidly, instead of as hitherto slowly and carefully, the cover under which ova are collected as a hanging preparation in this technique. The apparent triviality of the change is negatived by the finding that the maximum, average and minimum percentages of the presumed total ovum content recovered after rapid lift were 95, 85 and 61, and after slow lift 84, 62 and 40, so that in this series the average recovery of ova was by rapid lift increased 30 per cent., and equalled the maximum by slow lift. It was found, moreover, that rapid lift tends to herd the ova towards the centre of the preparation, that by definite movements of the slide this herding can be markedly increased, and that by others the herd can be dispersed, should the ova in it (for the herding movements tend to concentrate all matter in the preparation) be obscured by overcrowding. The herd forms a visible cloud, capable of being placed directly under the objective, consisting in favourable conditions of almost nothing but hookworm ova, and constituting in practice a marked contraction of the examination area. These statements are evidenced by charts showing the number of ova present in every square microscope field throughout the whole of a number of preparations, and by photomicrographs. It is felt that the phenomenon is likely to prove of essential significance in hastening, and therefore cheapening, a positive and, so it would also seem, a negative diagnosis.

It is next shown that preliminary centrifugal precipitation in a salt solution of s.g. 1050 (as advocated by BASS in 1909 to eliminate matter lighter than hookworm eggs but heavier than water) was likely to be followed by reduction of the efficiency of a subsequent centrifugal flotation ; and that the use of a salt solution of s.g. 1150 instead of 1200 reduced, in the cases tested, the number of ascaris and trichuris ova by ten-elevenths, and had a corresponding, but not necessarily parallel, effect in eliminating from the examination area matter other than ankylostome eggs, without reducing the average numbers of these collected. Diagnosis of ankylostomiasis is thus rendered rapider and easier.

There are stressed difficulties, generally unappreciated, in determining the ovum content of the faeces, and the worm content of the bowel, which render illusory certain estimates of the faecal ovum content produced by a single normally ovipositing female, knowledge of which should form the essential basis of every diagnostic technique. The evidence collected indicates that this last content lies between 10 and 500 per ccm. for hookworms, and that examination by D.C.F. of a fair sample of stool amounting to 1 cc. accordingly suffices to detect ova if a single female hookworm be normally ovipositing.

In the absence of any attempt by others to do so, the concentrative techniques of SHEATHER, MHASKHAR and WILLIS are checked against D.C.F. by comparative ovum counts. WILLIS's technique, so commonly used, but hitherto always apparently without control, is, for

instance, shown to deliver a markedly uncertain percentage of the ova which D.C.F. pushed to finality shows to be present, and is accordingly not advised where better can be used.

In Part XII the writer returns to his consistently expressed conviction that mass hookworm diagnosis cannot be adequate, financially or otherwise, until the material is examined, as all other like material is, at a central laboratory which should possess diagnostic and research sides. In view of the evidence collected that D.C.F. is the most certain known diagnostic method, the best means of bringing stools to a central laboratory in a condition suitable for this technique were next investigated. Provided faeces were kept under plain water at a temperature not over 28° to 30° C., D.C.F. remained fully effective, in the cases tested, for 35 to 81 days. It is pointed out that if those conditions be observed faeces collected in India could accurately be examined and reported upon in London, a point indicative of the value of the stubbornly maintained necessity for making these examinations in the field. There are exhibited microphotographs of ova, apparently normal, which had lain under water for 92 and 102 days respectively, and which had been collected by D.C.F. Accordingly, discarding mere simplicity and aiming for diagnostic certainty and rapidity (a practical synonym of cheapness), a scheme is outlined for the collecting, centrifuging and herding of preparations, based on a unit of 12 stools and corresponding to the use of a twelve-tube centrifuge adapted for the carrying out of D.C.F.

A summary of the work completed in the twelve preceding parts concludes the paper.

C. L.

MHASKAR (K. S.). **Report of the Ankylostomiasis Inquiry in Madras.**—*Indian Med. Res. Memoirs Supplementary Series to Indian Jl. Med. Res.* 1924. Oct. Volume No. 1. pp. 1–95. With 2 maps in text.

Work among the coolies at the Negapatam Emigration Depôt showed that ankylostomiasis was endemic, and that 98·6 per cent. of 11,500 coolies harboured hookworm. It is, in fact, universally distributed in the rural areas of the southern half of the Madras Presidency and is only slightly less—91 per cent.—in incidence in the urban areas. The infection appears to be compatible with good health. Roundworms occurred in 60 per cent. and whipworms in 37 per cent. of the coolies. Later attempts were made to ascertain how far propaganda and free medical help can induce the population to adopt sanitary habits, and the location of the Inquiry was transferred to Dindigul and Trichinopoly Central Jail. No improvement was apparent after two years of field campaign. The infection was found to be mainly by Necator, and is, on the whole, light (averaging 22 per person). *Ancylostoma duodenale* varied from 10 per cent. to 80 per cent. with an average of 10 worms per person. Ground itch and dermatitis was invariably absent. Pronounced anaemia and emaciation were rarely noticed. Occult blood in stools long after hookworms have been removed indicates a possible reason for refractory cases of anaemia. Haemoglobin index bears no clear relation to the number of hookworms present. Flies can carry hookworm eggs and larvae. Humidity appears to be correlated with intensity of infection. Hookworm is a predisposing factor in bowel complaints and in influenza.

Natural death of infection (ova and larvae) in the night soil occurs within 14 weeks. The larvae occur naturally unsheathed and do not migrate from the place of development. Night soil can be safely used as manure after 6 months. For treatment in the field betanaphthol in 50-grain single dosage without purgative gives the best results and is sufficient to reduce 90 per cent. of hookworm infection.

R. T. L.

ADLER (S.). **The Hookworms of Man in Sierra Leone.** [Miscellanea.]—*Ann. Trop. Med. & Parasit.* 1925. Mar. 31. Vol. 19. No. 1. p. 138. [4 refs.]

From 38 prisoners and 9 post-mortems on natives of Sierra Leone 4,305 hookworms were collected in Freetown Jail. Among these, 3,929, *i.e.*, 91·3 per cent., were *Necator americanus*, the remainder, 376, *i.e.*, 8·7 per cent., were *Ancylostoma duodenale*. The largest number in a single case was 483 Necator. The highest number of Ancylostoma was 196. In *N. americanus* the females were about three times as numerous as the males, while in *A. duodenale* the sexes were about equal in number.

In Sierra Leone *A. duodenale* occurs both in man and in the civet cat, and is evidently in an intermediate zone between the areas of high frequency of *A. duodenale* in the north and *N. americanus* in central and south Africa.

R. T. L.

RENNER (E. A.). **Report on Ankylostomiasis at Makeni, Northern Province.**—*Sierra Leone Ann. Med. & San. Rep. for the Year 1923.* (Appendix VIII.) pp. 67–68.

Of 116 men, women and children connected with the West African Frontier Force examined by the author 26, or 22·41 per cent., were found to harbour hookworms. No children under the age of 10 years were infected. One case of conjunctivitis and one of profuse lachrymation, which had proved refractory to the usual forms of treatment, cleared up on administration of thymol given for an accompanying ankylostome infection.

H. H. S.

EASMON (M. C. F.). **Report on Ankylostomiasis at Bo and Pujehun.**—*Sierra Leone Ann. Med. & San. Rep. for the Year 1923.* (Appendix IX.) pp. 69–70.

Of 100 persons examined at Pujehun, prisoners and admissions to hospital, 45 were found infected with hookworm ; of 84 at the Kennema Prison, Bo, 40 (47·6 per cent.) ; and of 152 at the Bo school 68, or 44·7 per cent. These figures are regarded as fairly representative of infection over the Central and Southern Provinces of the Protectorate. 26·6 per cent. were free from all helminthic infection. Ankylostomiasis is not, apparently, severe, since only some 3 per cent. showed any symptoms.

H. H. S.

CALLENDER (G. R.) & BITTERMAN (Theodore). **The Influence of Army Service on the Incidence of Hookworm Infection in the Philippine Scouts.**—*Far Eastern Assoc. Trop. Med. Trans. Fifth Biennial Congress Singapore 1923.* pp. 251–253. [8 refs.]

The incidence of hookworm infection in Filipino soldiers varies, roughly, inversely as the length of service and decreases rapidly from the fourth to the tenth years. The infection rate with Trichuris remains practically constant during army service. A survey of 933 Filipino troops gave the following results :—

Service in years.	Hookworm.		Ascaris.		Trichuris.		Negative.		Total No. of cases.
	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	
1 or less ...	138	77	27	15	134	74	13	7	180
Over 1 to 4 ...	221	72	24	8	236	76	21	7	309
Over 4 to 7 ...	74	53	20	14	94	68	20	14	139
Over 7 to 10...	29	26	9	8	81	72	23	20	113
Over 10 ...	35	18	31	16	125	65	54	28	192
Totals ...	497	53	111	12	670	72	131	14	933

The hookworm infection rate in recruits to the Philippine Scouts is approximately 75 per cent., and has remained practically constant for a period of about 20 years.

R. T. L.

STOLL (Norman R.). **Investigations on the Control of Hookworm Disease. XXXIII. The Significance of Egg Count Data in** *Necator americanus* **Infestations.**—*Amer. Jl. Hyg.* 1924. Sept. Vol. 4. No. 5. pp. 466–500. With 4 text figs. [8 refs.]

Hookworm infection and hookworm disease appear to be passing from the domain of clinical medicine and of helminthology to that of higher mathematics. Thus, in this thirty-third paper of a series on Hookworm Investigation, we learn after 18 pages of discussion that the relationship between stool and egg-count is worked out by the formula : $\Omega = \dfrac{n.\Sigma xy - \Sigma x.\Sigma y}{\sqrt{[n.\Sigma x^2 - (\Sigma x)^2]\ [n.\Sigma y^2 - (\Sigma y)^2]}}$

The author set out to find what constancy there might be in the day-to-day output of eggs from a given human host, and whether the egg-count measures the size of infestation, relatively or in the number of worms harboured. The total faeces passed over a long period were collected daily, and diluted in the proportion of 3 gm. faeces to 45 cc. decinormal NaOH. The daily variations are diminished by what are called "running averages" of two, three, or more day periods. We have also to take into account the fact that a formed stool really constitutes a concentration of ova, or, in other words, in a "mushy" stool there is a "natural dilution of the ova before counting." As this is in a ratio of about 1 to 2, in making the calculation if the stool is mushy its "size in grams" is halved and its egg-count doubled [this would appear to make the ratio 1 : 4]. The count is therefore, to ensure greater accuracy, reduced to the "basis of formed faeces." Previous determinations in Porto Rico have indicated an average of about 9,000 eggs per day for each female worm.

H. H. S.

DAVIS (Nelson C.). **Experience with the Stoll Egg Counting Method in an Area lightly infested with Hookworm.**—*Amer. Jl. Hyg.* 1924. May. Vol. 4. No. 3. pp. 226–236. [5 refs.]

Stoll's method applied to a group of 67 residents of Cachoeira, in Brazil, gave a series of figures indicating that the number of eggs per female hookworm per day and the number of eggs per female per gram of faeces were much greater in this locality than those given for Porto Rico by STOLL. Stoll's constant 44, representing the number of hookworm eggs per female per gram of formed faeces, would give an altogether erroneous idea of the infection rate, the constant arrived at by the author being 70. It is suggested that diet may have influenced the difference. To those dealing with hookworm a table is added showing the relation of the egg count to the number of ascaris females passed after treatment. An enormous variation occurred from case to case as in the hookworm cases. The author considers that it is more valuable in treatment campaigns to know the actual infection rate, although for purposes of sanitation it may be "important to know the number of eggs deposited on the soil." For practical purposes of estimating infestation the examination of one or two direct smears and the Willis brine-flotation method give sufficiently reliable data for routine inspections.

R. T. L.

MANALANG (C.). **Ankylostomiasis. I.—Laboratory Diagnosis of Hookworm Infection.**—*Jl. Philippine Islands Med. Assoc.* 1924. Nov. Vol. 4. No. 11. pp. 421–424.

This paper appears to be the first of a series. The question of the laboratory diagnosis of hookworm infection is dealt with. The superiority of concentration and culture methods over direct smears from the stool is shown. The author employs for the former a modification of the method of CROPPER and ROW, using gasoline in place of ether. Explanations are given for the failure to diagnose infection though worms are present, *e.g.*, absence of ova in the faeces, the worms being males only, or the females being immature. The paper gives some useful hints for those commencing work on these parasites, and not in touch with previous literature.

H. H. S.

SVENSSON (Ruth M.). **A Morphological Distinction between Infective Larvae of Ancylostoma and Necator.**—*Proc. Soc. Experim. Biol. & Med.* 1925. Jan. Vol. 22. pp. 261–262.

By keeping the larvae of Necator and Ancylostoma in moist sand for five weeks and more the attenuated larvae show a difference, believed to be generic, at the point of union between the oesophagus and intestine. An open space is distally marked off by a definite transverse line in Necator, while in Ancylostoma larvae the intestine follows directly upon the oesophagus.

R. T. L.

OUDENDAL (A. J. F.). **The Intestinal Wall in Cases of Ankylostomiasis.**—*Far Eastern Assoc. Trop. Med. Trans. Fifth Biennial Congress, Singapore 1923.* pp. 280–285. With 7 figs.

The intestine of a patient infected with ankylostomes is characterized by the thick moist anaemic appearance of the rugae of the small intestine. The lytic, indeed histolytic, action of the parasite in the tissue is described and illustrated. There are always many ulcers. The ulcer itself is very deep with the form of a groove the base of which is formed by necrotic tissue and dense infiltrations with leucocytes and lymphocytes. In sections of ulcers stained both by Gram and with methylene or toluidine blue not a single micro-organism is to be found. Ankylostome ulcers heal and a series of many large epithelial cells in the form of tubes and with nuclei containing much chromatin is to be seen amongst normal intestinal epithelium. As a rule the muscularis mucosae has become partially or wholly lost on the site of these epithelial proliferations and the new epithelial cells are in direct contact with the connective tissue.

R. T. L.

DJAMIL (Mohamed). **An Investigation into the Renal Function in Ankylostomiasis.**—*Far Eastern Assoc. Trop. Med. Trans. Fifth Biennial Congress Singapore 1923.* pp. 270–280.

In uncomplicated ankylostomiasis there is no increase of bilirubinaemia or urobilinuria. The anaemia must therefore be produced in some other way than by a haemolytic process. The appearance of the blood with the presence of achromasia, pessary-shaped corpuscles, anisocytosis, and in severe cases poikilocytosis, indicates an aplasia or degeneration of the bone marrow. The orange-yellow colour of the face even in the dark-coloured inhabitants of the tropics, the slower growth and development of the children, the enlargement and hypertrophy of the left side of the heart, all suggest the operation of a toxic process. As the excretion by the kidneys of toxins gives rise to unfavourable consequences the author has ascertained the Ambard's constant for sufferers from ankylostomiasis. He concludes that it is possible to decide with absolute certainty that, with sufferers from ankylostomiasis with typical symptoms, there exists a disturbed function of the kidneys resulting in an abnormal excretion which can only be explained by the action of a powerful toxic influence, either unknown albumens or toxins, on the organism and not as a result of the anaemia on the kidney epithelium.

R. T. L.

ACKERT (James E.). **Notes on the Longevity and Infectivity of Hookworm Larvae.**—*Amer. Jl. Hyg.* 1924. May. Vol. 4. No. 3. pp. 222–225. [5 refs.]

A quantity of sheathed hookworm larvae (probably *N. americanus*) taken from Trinidad to Manhattan remained alive in a culture of cistern water for one year and a-half. The temperatures varied from 45° to 98° F., fluctuating mostly from 60° to 85° F. GOODEY's laboratory method for testing skin infection [with, however, parchment replacing the live rat skin !] showed that these larvae were no longer infective,

although they responded to heat stimulation. A considerable number of empty sheaths were present in the 18-month old culture, but unsheathed larvae were seldom found alive.

R. T. L.

CHANDLER (Asa C.). **Animals as Disseminators of Hookworm Eggs and Larvae.**—*Indian Med. Gaz.* 1924. Nov. Vol. 59. No. 11. pp. 533–537. [14 refs.]

The devouring of faeces by pigs, rats, dogs or other animals, possibly with the exception of chickens, cannot be looked upon as a desirable destruction of refuse, but rather as a very dangerous process resulting in the dissemination of the eggs of human intestinal parasites. The author has repeated the experiments of GORDON, ACKERT, PAYNE and GOODEY, and has failed to infect three young pigs with *Necator americanus* larvae. The results are not conclusive, but in his opinion merely indicate that the pig is not readily susceptible to infection with *N. americanus*. "The close relationship parasitologically, between pigs and man, would lead one to hesitate to separate specifically parasites found in these two hosts unless the differences shown by them were very well marked."

Feeding experiments on pigs, rats and dogs are detailed, which confirm previous work and show that viable hookworm eggs can be disseminated in the faeces of these animals after feeding on infected human faeces.

R. T. L.

MANALANG (C.). **Note on *Ancylostoma braziliense* as a Human Parasite in the Philippines.**—*Jl. Parasit.* 1924. Dec. Vol. 11. No. 2. p. 90. With 1 text fig.

A. braziliense has been found by the author in the dog in Manila. It occurred also in over 11 per cent. of 136 hospital cases treated for hookworm infection from three provinces of Mindanao and Sulu and one province of the Visayan group. They were always observed in Filipinos, never in Americans, Chinese or Japanese. The incidence was about 1 per cent. in 1,000 parasites collected from 115 inmates in a penal farm. In every case the number present was small.

R. T. L.

WASHBURN (B. E.). **The Economic Value of a Hookworm Campaign.**—*Proc. Internat. Conference on Health Problems in Trop. America.* 1924. pp. 613–623. With 3 charts. [United Fruit Company, Boston, Mass.]

In seven rural and one urban area of Jamaica the Rockefeller Hookworm Commission conducted campaigns between 1920 and 1923, which received the co-operation of over 99 per cent. of the population. The results demonstrate their marked economic value from the standpoint of the community, the employer, and of the individual. The most important result from the standpoint of the community has been the marked decrease in sickness, especially from typhoid and dysentery. Better conditions of health with increased resistance

against contagions and the capacity to do more work and earn more money are among those results which tend to improve the lot of the individual., Tables and typical replies to queries addressed to estate managers bear out the author's remarks.

R. T. L.

DESTÉFANO (Francisco) & VACCAREZZA (Raúl F.). **Tratamiento de la anquilostomosis por el tetracloruro de carbono.**—*Semana Med.* 1924. No. 10. 32 pp. [28 refs.]

Carbon tetrachloride is the best vermifuge in human ankylostomiasis. Its advantages over other anthelmintics are: Greater efficiency, equal or less toxicity, determinate constitution, easy administration, and very low price.

It must be given on an empty stomach, in the maximum dose of 3 cc. for adults and at the rate of 0·2 for every year of age in children, after a saline purgative. It should be administered only twice to the same person, and an interval of 20–30 days must elapse between the first and second dose.

In more than 60 per cent. of the cases complete cures, from the microscopical point of view, are obtained by a single dose, while in the remainder the majority of the ankylostomes are eliminated. The proportion of cures obtained by administration of Oleum chenopodii is 30 per cent.

Toxic effects of carbon tetrachloride, when given in the maximum dose, are absent or of no significance if the drug is sufficiently pure and precautions are taken to avoid as far as possible intestinal absorption and if the subject shows no sign of hepatic insufficiency. Its use therefore is contra-indicated in alcoholic subjects.

From the point of view of the practitioner who has no occasion or possibility of verifying the anthelmintic action of the drug, the following lines of treatment should be adopted:—

For treatment "en masse" two cures should be prescribed within the indicated doses, with an interval of 30 days between the first and second. The interval enables the liver to restore its deranged function and gives larvae in the organism of the patient time to develop into mature worms which should be eliminated by the second dose.

In individual treatment 15 days later chenopodium oil (1·5 cc.) should be given: the patient is then supposed to be cured.

R. T. L.

KHALIL (M.). **Carbon Tetrachloride as an Anthelmintic in** *Ancylostoma duodenale* **Infection.**—*Reports and Notes of the Public Health Laboratories Cairo. No. 6.* 1924. pp. 79–93. [27 refs.]

Experience during 1923 of more than 4,000 cases has fixed the optimum dose of carbon tetrachloride for *Ancylostoma duodenale* at 5 cc., followed by a saline purge. Khalil points out that at least a week must elapse before the stool should be re-examined for ova; otherwise an incorrect conclusion as to the effectiveness of the drug may be reached. Most ankylostomes are passed during the first 24 hours, while ascarids are passed during the second day. Carbon tetrachloride was found to be much more effective than Ol. chenopodii or thymol for ankylostomes, but less so than Ol. chenopodii for ascarids.

T. W. M. C.

SOPER (Fred. L.). **Treatment of Hookworm Disease with a Combination of Carbon Tetrachloride and Oil of Chenopodium. Comparison of Results of Simultaneous and Delayed Administration of Magnesium Sulphate.**—*Amer. Jl. Hyg.* Baltimore. 1924. Nov. Vol. 4. No. 6. pp. 699–709. [9 refs.]

The work on which this report is based aimed at determining: (1) The degree of infestation and species of hookworm harboured by Paraguayan soldiers; (2) the efficacy of treatment by combined carbon tetrachloride (1·8 cc.) and oil of chenopodium (0·6 cc.); (3) the comparative effects of a purgative of magnesium sulphate when given simultaneously with the anthelmintic and when given two hours later.

As regards the first point, infestation was found to be very heavy, and 90 per cent. of the worms were Necator. The combined drugs proved very effective, and no case of toxic action was met with. As regards the third point, it was found that the anthelmintic action of the drugs and purgative was almost the same in both, but that when the magnesium sulphate was given simultaneously with the drugs expulsion was often delayed for 24 hours. The anthelmintic action itself did not seem to be affected, for the worms passed on the second day after were found to be partly digested.

H. H. S.

SMILLIE (W. G.) & PESSOA (S. B.). **Treatment of Hookworm Disease with a Mixture of Carbon Tetrachloride and Ascaridol.**—*Amer. Jl. Trop. Med.* 1925. Jan. Vol. 5. No. 1. pp. 71–80. [9 refs.]

An interesting series of experiments is here recorded, showing the superiority of a combination of carbon tetrachloride and ascaridol over other anthelmintics. In the first group of patients treated adults were given 2 cc. of carbon tetrachloride at 6 a.m., and an hour later 0·5 cc. of ascaridol; at 8 a.m. a saline purgative. These doses are well below the toxic limits of either drug; nevertheless, 98 per cent. of the worms harboured were passed. To a second group was given a mixture of 4 parts carbon tetrachloride and 1 part ascaridol, 2 cc. being the dose for adults, divided into two doses, and given at an hour's interval. As a result 92·6 per cent. of the total number of worms were passed.

Smaller doses were less effectual than these last, though considerably better than either of the drugs separately. The toxicity is not increased by the combination. The efficiency, however, is much reduced if the drugs are combined with castor oil.

It was found also that carbon tetrachloride had a selective action on female hookworms, while ascaridol attacked the males and also was effective in removing Ascarides for which carbon tetrachloride is almost useless.

H. H. S.

SWEET (W. C.). **The Effect of Carbon Tetrachloride on the Egg-Laying Powers of the Female Hookworm.**—*Amer. Jl. Hyg.* Baltimore. 1924. Nov. Vol. 4. No. 6. pp. 691–698. [3 refs.]

At a resurvey of the Queensland Hospital for the Insane 26 persons were found infected with hookworm. Egg-counts by Stoll's method were made on samples of faeces from each for three successive days.

The patients were then divided into three groups. Those of the first, comprising 9 males, were given 1 cc. of carbon tetrachloride in water; the second and third groups, of 8 and 7 females, were given 1·5 cc. and 2 cc. respectively, and egg-counts were made daily for the succeeding 10 days.

It was found that the effect of the drug on the egg-laying power of the ancylostomes was but slight, and that all inhibition had disappeared at the end of a week. The author found indications tht the female *Ancylostoma* has some five times the egg-laying power of the *Necator*.

H. H. S.

DAVIS (Nelson C.). **Hookworm Infection as influenced by the Wearing of Shoes.**—*Amer. Jl. Trop. Med.* 1925. Jan. Vol. 5. No. 1. pp. 81–86. [3 refs.]

From investigations carried out by the author as to the relative amounts of infection by hookworm amongst various age groups and in both sexes of workers in the fields in a part of the State of Rio Grande, it is concluded that the wearing of shoes has a definite beneficial effect, as would be expected. Actual figures, however, lose a good deal of their value, since "shoes" may be merely wooden-soled slippers which would afford little, if any, protection, and also since some of those who wear shoes discard them temporarily when at work.

H. H. S.

KHALIL (M.). **The Classification of the Family Ancylostomidae.**—*Reports and Notes of the Public Health Laboratories Cairo. No. 6.* 1924. pp. 195–196. [6 refs.]

This classification agrees with that of LANE (1917), except that the sub-family *Bunostominae* is re-established in accordance with the Rules of Nomenclature. A key is given for the identification of the genera.

T. W. M. C.

KAMEYAMA (Shin). [**A Contribution to the Diagnosis of Ankylostomiasis by Eosinophile.**]—*Okayama Igakkwai Zasshi (Jl. of Okayama Med. Soc.).* 1924. July. No. 414. [Summarized in *Japan Med. World.* 1924. Dec. 15. Vol. 4. No. 12. p. 338.]

The eosinophile cells increase in absolute number and in the percentage of white cells in inflammatory as well as non-inflammatory cases of ankylostomiasis.

R. T. L.

ALLES (E. C.). **Acute Intestinal Obstruction caused by Dense Accumulation of Round-Worms.** [Correspondence.]—*Brit. Med. Jl.* 1924. Nov. 29. p. 1001.

BEERS (G. H.). **Removal of *Filaria Loa* from Conjunctiva.**—*Jl. Amer. Med. Assoc.* 1924. Nov. 8. Vol. 83. No. 19. p. 1507.

CAWSTON (F. G.). **The Source of South African Trematodes.**—*Ann. Trop. Med. & Parasit.* 1924. Oct. 31. Vol. 18. No. 3. pp. 343–346.

——. **Occasional Hosts of Some South African Trematodes.**—Reprinted from *S. African Jl. of Science.* 1923. Dec. Vol. 20. pp. 351–353. [5 refs.]

DEEKS (W. E.). **The Cause of Hookworm Disease, its Prevention and Cure.**—12 pp. With 13 figs. [Issued from the Medical Department, United Fruit Company, Boston, Mass.]

GEDOELST (L.). **Notes de parasitologie congolaise.**—*Ann. Soc. Belge de Méd. Trop.* 1924. Nov. Vol. 4. No. 2. pp. 247–253.

HAIM (Emil). **Ueber durch Spulwürmer verursachte Komplikationen nach Magen-Darmoperationen.**—*Zentralbl. f. Chir.* 1924. Apr. 12. Vol. 51. No. 15. pp. 790–791. 5 refs.

PHILP (H. R. A.). **Clinical Signs due to the Presence of** *Ascaris lumbricoides.*—*Kenya Med. Jl.* 1924. Oct. Vol. 1. No. 7. pp. 203–206.

PODIAPOLSKY (Barbara). **Zur Kenntnis der Fauna der parasitischen Würmer bei Ratten.** [Abstract.]—*Rev. Microbiol. et Epidemiol.* Saratov. 1924. Vol. 3. No. 4. pp. 309–310. With 1 plate. [In Russian pp. 280–290.] [7 refs.]

STULZ (E.) & FONTAINE (R.). **Un cas de Filariose de Médine.**—*Bull. Soc. Française Dermat. et de Syph.* 1924. July. No. 7. pp. R.S. 88–R.S. 91. [Réunion dermat. de Strasbourg.]

REVIEWS AND NOTICES.

Manson's Tropical Diseases. A Manual of the Diseases of Warm Climates. Edited by PHILIP H. MANSON-BAHR, D.S.O., M.A., M.D., D.T.M. & H. Cantab., F.R.C.P. Lond. Eighth Edition, Revised. pp. xx+895. With 20 colour plates, 7 half-tone plates, 387 figures in the text, 6 maps and 33 charts. 1925. London, New York, Toronto and Melbourne : Cassell & Company, Ltd. [Price 31s. 6d. net.]

In the preface to this, the eighth edition of perhaps the best known text book of Tropical Medicine, the editor alludes to the death, since the publication of the last edition in 1921, of Sir Patrick MANSON, the original author, and states, in regard to the present volume, that while founded upon his teaching and embodying not a little of his writing, it has been drastically revised and, indeed, remodelled in order to bring it abreast of the latest developments in this province of medicine. The section on Medical Zoology has been entirely rewritten. Many fresh illustrations have been inserted, including six skeleton disease-distribution maps. The volume remains essentially a text-book and covers the ground of tropical diseases in 630 pages and, without taking on encyclopædic form, deals adequately with Medical Zoology in an appendix of another 230 pages. The arrangement of the contents may not meet with the approval of all, but, in any case, it is simple, and the subject-matter easily accessible and up to date. Some may question the advisability of including the zoological appendix at all in a text-book of tropical diseases, but, on the whole, it is useful for the tropical practitioner to have this part of the subject under the same cover. At the same time the space given up to snakes would seem to be unnecessarily great.

There is some evidence that the book has suffered in some sections from revision, and perhaps hurried writing, so that in the description of a disease its entity does not unfold itself in a harmonious picture, but rather as a patchwork of symptoms and pathological findings. This is of course common, unfortunately, to nearly all medical text-books, and arises from following the methods of our ancestors, who had only signs and symptoms to describe together with macroscopic post-mortem material. The time has surely come, and why should not tropical medicine lead the way, when the pathogeny and under-lying pathological changes in disease should no longer be divorced from the clinical description, but the two correlated as direct cause and effect. Take pellagra as an example: I am afraid the student reading the individual sections dealing with the pathological changes in the nervous system, and with the nervous symptoms, would have but a confused idea of this aspect of the disease. All the changes in the spinal cord are identical with those of subacute combined degeneration of the cord as seen in this country, and are typical of those produced by a toxaemia. It is, then, obvious that the disease cannot be due specifically to a dietetic deficiency, though it remains possible that only in the absence of some food principle does the toxin act. Such an idea one is glad to see mentioned by the editor in connexion with beriberi; why not in pellagra? It is a point not sufficiently insisted upon in dealing with so-called deficiency diseases. The absence of a "something" cannot produce anything; rather in the absence of a "something" something else may act.

Again, for the student, many phrases are ambiguous or the sense obscured. Referring to anaesthesia in the diagnosis of macular eruptions in leprosy, the following occurs: "In no other skin disease is definite anaethesia a symptom," suggesting that leprosy is itself a skin disease, or under yaws pathology: "No visceral changes have been found peculiar to yaws," suggesting that visceral changes are found in cases of yaws, but that they are common to other diseases. In dealing with the

differential diagnosis of malaria the author says, "marked excess of polymorphonuclear leucocytes would be in favour of hepatic abscess," without stating whether this refers to a relative or absolute excess.

In the same section "urethral fever" is referred to—a term not in general use as far as the reviewer knows. A "pseudo-positive Wassermann reaction" in malaria is also alluded to: if a reaction is positive, it is positive whether it occurs in a case of syphilis or malaria. In this connexion the editor states that a positive reaction obtains in 28 per cent. of cases of malaria in the acute stage, a statement which has been contradicted by other observers. There are, naturally, opinions expressed which may not be accepted by others, and some inaccuracies. Under sprue the proportion of fatty acids to neutral fats is given as 1 : 3, whereas this should be reversed.

There is evidence, too, that some statements which found their way into the text of past editions have not yet suffered, at the point of the blue pencil, the penalty of being incorrect. The bare statement that "in all cases of nodular leprosy the testes atrophy" is hardly a correct statement of fact, and most of those who have studied yaws will not allow that in that disease "the primary lesion may appear as a vesicle which develops in a few days into an ulcer with an undermined granulating base."

One welcomes the section dealing with coli infections as a valuable addition, and one hopes that in a subsequent edition the subjects of tuberculosis and syphilis among native races will receive a place.

It is, of course, impossible to review fully a text-book, and, indeed, unnecessary in the case of this well-known and deservedly popular volume. The criticisms made above are merely offered as suggestions when the time comes for the ninth edition.

Hugh S. Stannus.

KENNEDY (Alex. Mills) [M.D. (Glas.), Professor of Medicine, University of Wales, etc.]. **Parasitology for Medical Students.**—pp. x+142. With 1 coloured plate & 61 text figs. 1925. London: Oxford Medical Publications. Humphrey Milford. Oxford University Press. [Price, 10s. 6d. net.]

Parasitology has long been the Cinderella of the British medical curriculum, and any attempt likely to raise this science from its present lowly position therein merits most cordial support. The reader who takes up this volume in the hope of finding some material contribution towards the desired end is doomed to disappointment.

The book contains six chapters; one (41 pages) deals with "Insects and Arachnoids," three chapters (51 pages) are devoted to Helminths, while "Protozoa," "Spirochaetes and Fungi" take up the remaining 46 pages.

The parasites selected for consideration are described, generally speaking, in a confused medley of undifferentiated familial, generic and other characters, often ill-balanced from inclusion of unimportant details and omission of points of real diagnostic significance. In few instances could any specific identification be based on the accounts given, and sometimes characters are described which would absolutely exclude any specimen from the species under consideration. For example, the thorax of *Stegomyia fasciata* is said to be covered with flat scales. And what purpose is served by telling students that "the common rat flea" "resembles *Pulex irritans*, but is yellow and possesses more bristles on its head"? That ancient fable regarding the specific significance of the wing venation of *Musca domestica* crops up again. One might hold the printer responsible for the cryptic saying that the mosquitoes of medical importance are "the Anophelinae and the Culicidae," but the endowment of *Ornithodorus moubata* with a head seems to render this charitable assumption unnecessary.

The pages bristle with similar mistakes. The trophonucleus of *Trypanosoma rhodesiense* is described as " usually " sited near the posterior end of the parasite, and it is clear that the author has never observed the development of ancylostome larvae for himself. Head and body lice are said to possess 7 and 8 abdominal segments respectively, and the spiracles of *Pediculus* (sic) *pubis* are confused with the lateral abdominal protuberances. The author is unjustifiably dogmatic regarding the skin appearances produced by certain insect bites, and would be more guarded in his statements if he had compared the varying skin lesions caused by feeding the same biting insects on himself and on others.

The foregoing recital of inaccuracies and misstatements—which is far from complete—sufficiently indicates the scientific status of this publication, and the reviewer finds nothing to counterbalance its obvious shortcomings. Zoological classification and systematic nomenclature—those stumbling blocks to the beginner—are calmly ignored, grave omissions in a work professedly written for elementary students. Indeed, the reader will search the book vainly for any exact knowledge of the parasites included, or any grasp of the fundamental principles of medical zoology.

This is a dangerous book for the student at a period when he is convinced of the plenary verbal inspiration of his text-books.

W. P. MacArthur.

RODENWALDT (Ernst). **Kaart en determineertabel van de anophelinen van Nederl. Oost-Indië.**—3 pp. With 1 folding table & 20 figs on 2 folding sheets attached in case. 1924. Batavia: Topografische Inrichting.

The differential characters of the Netherland East Indian species, 20 in number, considered by the author to be distinct, are clearly tabulated, and are also illustrated by enlarged semi-diagrammatic figures, along with statements of the breeding-places and pathogenic significance of each one.

A. Alcock.